SCIENCE GOSSIP.

cutting opposite →

See "Osler's first appearance in print", a column by W. R. B[ett] under Nova et Vetera in B. M. J., 1937, ii, p. 1026, giving the prices, etc., of recent copies of this vol., and of the February no. in which the paper appeared.

2 "NOTES & Qu." on p. 94 signed "W.O."

~~J. supra. 4~~
WF. 4

Funds for the restoration of this volume were donated by:
EVE OSLER
HAMPSON FUND

3535. Christmas and the Microscope. 1a. 8°. (*Lond.*, 1869.)

Hardwicke's Science-Gossip . . . ed. by M. C. Cooke, vol. 5 (for 1869), Lond., 1870.

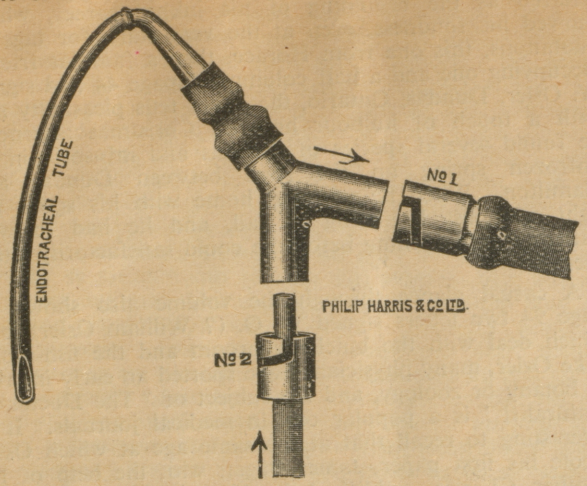
The article catalogued (p. 44; Feb. 1869) records the finding of diatoms, &c., and is signed: W. Osler, Dundas, Ontario. The vol. was purchased in 1922.

"The very start of my ink-pot career" (see the Introduction to this catalogue).

3535

FROM
THE LIBRARY
OF
SIR WILLIAM OSLER, BART.
OXFORD

limb of the Y tube to the point of union of the three limbs,



and is connected externally by a length of light rubber tubing to the source of anaesthetic vapour.

The idea is this: The child is anaesthetized, and a small rubber Magill catheter is passed into the trachea, and this is connected to one limb of the Y tube. Oxygen and ether are delivered by connexion No. 2 up to the crossways of the Y tube. The inspiration and expiration of the child are unhampered, because the remaining limb of the Y carries a foot-long exhaust tube freely opening to the outer air. It is to be noted that the exhaust pipe and all limbs of the Y are of greater diameter than that of the child's trachea, and yet the length of the exhaust is sufficient to prevent too free an escape of the anaesthetic vapour.

a long key, such as is used to wind up an old-fashioned clock or a toy engine. The key is removed after approximating the blades to the degree required, so that nothing is left to project above the edges of the wound. Upon alternate days the key is reapplied to tighten the grip on the spur, and then taken away again. The mechanism is simple (Fig. 2), and it is rare for the instrument to require adjustment. By turning the key (A) a screw (B) is driven downwards on to a strong steel collar lever (C), hinged upon the opposite blade. This collar acts upon a sloping steel shoulder (D) jutting out from the right-hand blade. The further the screw and collar are depressed the nearer the right-hand blade becomes approximated to its fellow. A small flat spring (E), inserted between the upper ends of the blades, facilitates introduction. As in the Paul, or Mikulicz, instrument, the face of each blade is serrated and the ends are everted, but the blades are rather wider, which lessens the danger of haemorrhage due to cutting through, and obviates the repeated reapplication which was often necessary with the narrower-bladed instrument. This enterotome has been found during the last two years to serve its purpose efficiently without causing the patient the discomfort of the old instruments. I am indebted to Mr. L. R. Braithwaite for his helpful suggestions, and to Mr. George Blomfield for making the original drawings. The instrument is made by Messrs. Chas. F. Thackray, Ltd., Park Street, Leeds.

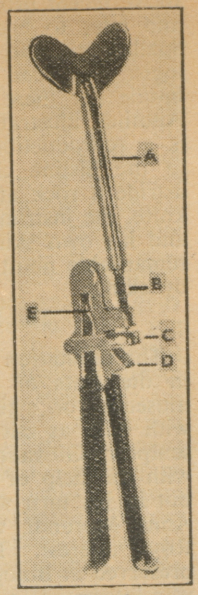


FIG. 2.

posthumous acceptance of her anatomical preparations

Nova et Veteres

1026 Nov. 20, 1937 NOVA ET VETERA THE BRITISH MEDICAL JOURNAL

ing and chief ornament of her sex," Laura Maria Caterina Bassi, recent professor of universal philosophy at Bologna and later to become famous as the teacher of Lazzaro Spallanzani, the physiologist and experimental morphologist, expanded her thesis to a crowded audience, while beside her there sat two women for her moral support. Another illustration bearing on the subject of *écorchés* is a reproduction of Michelangelo's "Last Judgement" in the Sistine chapel, showing St. Bartholomew sitting astride a rock at the feet of Jehovah, with a brandished knife, the instrument of his martyrdom, in his right hand, and his own skin hanging down from his left hand, the remarkable point being that his body is normally covered by skin.

The Bologna Anatomical Museum

The reputation of the renovated theatre impressed those in the seats of the mighty, including cardinals, and a museum for artistic anatomical models was established with Lelli as custodian, and a year later a clever young sculptor, Giovanni Manzolini, became his assistant, and with the help of a surgeon, Boari, outstripped his chief, but in his turn was excelled by his pupil and later wife, Anna Morandi, whose anatomical preparations attracted Royal interest. The wax effigies of these two artists, still preserved in Bologna, are reproduced in this article. Lelli was interested in physics and mechanics, became director of the Mint, superintendent of a factory for making instruments, and president of the Academy of Sciences. After his death Luigi Galvani, the pioneer of electrophysiology, was appointed custodian of the anatomical museum, and in 1777 delivered a public oration in praise of Anna Morandi Manzolini on the occasion of the

[1] Cushing, H. (1937). *Yale J. Biol. and Med.*, **9**, 199–213, Figs. 18.

To his article, written when he was 20 years old, Osler referred as the beginning of his inkpot career, which showed his fondness, even at the very start, for tags of quotations, this one from Horace, then a familiar friend. Occupying one and a half columns of page 44 and signed W. Osler, Dundas, Ontario, the paper tells pleasantly and with a touch of humour how on Christmas afternoon he found several species of diatoms and infusoria in an unfrozen spring on the road between Dundas and Hamilton. When he returned home with his spoils the light was just beginning to fail, and he had to wait patiently until evening before he could satisfactorily study them.

A casual glance through the volume also shows on page 94 two letters signed W. O. (? William Osler), and which deal with the butcher's broom and the fish-moth. Like Osler, many physicians have sported an early interest in botany or zoology, and the subject of "The Doctor as Naturalist" is a popular one in medical journals. It is interesting to recall that at the same age at which Osler wrote his first paper, James Paget, with the help of his brother Charles, published in 1834 a "Sketch of the Natural History of Yarmouth and its Neighbourhood."

W. R. B.

[1] A preliminary note in the *Bulletin* incorrectly gives the volume number as 44.

The Commissioner for the Special Areas has made a final offer of a grant of £90,000 towards the cost of building a new general hospital at Whitehaven, on condition that the Cumberland County Council and the Whitehaven Town Council, who are collaborating with the Whitehaven hospital authorities, contribute £20,000 and £2,000 respectively.

Nova et Vetera

ERCOLE LELLI AND HIS ÉCORCHÉ

In a scholarly and beautifully illustrated article Professor Harvey Cushing,[1] who has so often acknowledged the debt of modern surgeons to anatomists, especially those fathers who begat us, sketches the life and achievement of Ercole Lelli of Bologna, an anatomical artist whose models of "muscle-men"—the skin and superficial tissues being absent—or *écorchés* were much admired in the eighteenth century. This biography is led up to by an admirable account of the anatomical school of Bologna, where Guglielmo da Saliceto taught anatomy and surgery in the thirteenth century, Mondino de' Luzzi in the next century, Berengario da Carpi and Maggi in the sixteenth century, when Vesalius came over from Padua in 1539 to lecture on anatomy for the first time in terms of function. As was natural enough, the Bolognese took too much pride in their teachers to attempt to annex the anatomist who has been described as "the most commanding figure in European medicine after Galen and before Harvey." Bologna had the teachers, but they were not given an anatomical theatre worthy of them until 1638; it was then "a miracle of art," and soon became famous throughout Europe. It was nearly a century later—in 1734—that Lelli came on the scene, when the anatomical theatre was to be renovated, and he volunteered to provide two anatomical figures, male and female, *écorchés,* as supports for the canopy over the seat of the professor so that he could use them conveniently for demonstrations. Illustrations in Cushing's article show Ercole Lelli's portrait with a myological *écorché,* and also one of Volcher Coiter painted in 1575 with an *écorché,* thus long antedating Lelli. The theatre, decorated in addition with statues of Hippocrates, Galen, and anatomical fathers of Bologna, is shown in an illustration taken from an illuminated document; it gives the memorable séance in 1734, when that "prodigy of learning and chief ornament of her sex," Laura Maria Caterina Bassi, recent professor of universal philosophy at Bologna and later to become famous as the teacher of Lazzaro Spallanzani, the physiologist and experimental morphologist, expanded her thesis to a crowded audience, while beside her there sat two women for her moral support. Another illustration, based on a contemporary engraving, shows the posthumous acceptance of her anatomical preparations for public use by the Institute of Arts and Sciences.

Professor Harvey Cushing expresses some regret that, although in his student days many were encouraged to supplement their textbooks by purchasing plaster models and painting on them muscles and so forth, all this is past, and modern anatomical science is no longer concerned about the relationship of anatomy to art. But he likes to picture the spirit of Ercole looking down with approval when a department of art as applied to medicine was established at the Johns Hopkins Medical School, and on Max Brödel's work there forty years ago.

HUMPHRY ROLLESTON.

OSLER'S FIRST APPEARANCE IN PRINT

Such was the quality of Osler's greatness that to-day, in Britain and in America, anything from his pen has a market value, while his earliest writings have become so scarce as to be practically unobtainable. Thinking perhaps along these lines, and possibly in sentimental mood, the *Bulletin of the* (Johns Hopkins University) *Institute of the History of Medicine* has reprinted (January, 1937, **5**, 91–93) his first paper, "Christmas and the Microscope," which was published in Hardwicke's *Science-Gossip,* London, February 1, 1869. This semi-popular magazine is now defunct and in little demand, with the exception of the fifth[1] volume (the date of this appears as 1870 on the title-page, as 1869 on the back), which is relentlessly pursued by Oslerians on both sides of the Atlantic. Some ten years ago the writer of this note had the good fortune to pick up a copy in Farringdon Street for threepence. About that time Dr. W. W. Francis, the Osler Librarian, through advertising acquired his copy for the *Bibliotheca Osleriana,* but he had to buy a complete and expensive set. Quite recently a New York antiquarian bookseller listed the February, 1869, issue in original wrappers for eighteen and a half dollars, while another bookseller in the same city offered the whole volume in half-calf for thirty-two and a half dollars.

To his article, written when he was 20 years old, Osler referred as the beginning of his inkpot career, which showed his fondness, even at the very start, for tags of quotations, this one from Horace, then a familiar friend. Occupying one and a half columns of page 44 and signed W. Osler, Dundas, Ontario, the paper tells pleasantly and

A Monthly Medium of Interchange & Gossip

FOR STUDENTS AND

LOVERS OF NATURE.

Contents.

English Plant-names.
Ianthina (The Violet Sea-snail).—*Illustrated.*
Buds, as Objects for Winter Study. *Illustrated.*
The Siskin.—*Illustrated.*
Gudgeon Scale.—*Illustrated.*
The Winter Home of the Humble Bee.—*Illustrated.*
Zoology.
Microscopy.
Botany.
Notes and Queries.
Notices to Correspondents.



Vols. I., II., III., and IV., in handsome Cloth Covers, price 5s., at all Booksellers

LONDON

ROBERT HARDWICKE 192 PICCADILLY

NEGRETTI & ZAMBRA,

OPTICIANS AND METEOROLOGICAL INSTRUMENT MAKERS,

108, HATTON GARDEN; 59, CORNHILL; 153, FLEET STREET (next to REGENT S

COLLECTION CATALOGUE FOR NATURALISTS,

A ruled book for keeping a permanent record of Objects in any branch of Natural History. With Appendix for recording interesting particulars, and lettered pages for General Index. Strongly bound, 200 pages, 7s. 6d.; 300 pages, 10s.; and 2s. 6d. extra for every additional 100 pages. Working Catalogues, 1s. 6d. each.

Fourpence Monthly.]
Registered for Transmission Abroad.

[No. 50.—Feb. 1, 1869.
All the back Numbers kept in print.



Hardwicke's

Science-Gossip:

A Monthly Medium of Interchange & Gossip

FOR STUDENTS AND

LOVERS OF NATURE.

Contents.

English Plant-names.
Ianthina (The Violet Sea-snail).—*Illustrated.*
The Winter Home of the Humble Bee.—*Illustrated.*
Zoology.

Covers, price 5s., at all Booksellers. Cloth Cases, 1s. 6d.

AMBRA,
TEUMENT MAKERS TO THE QUEEN,
STREET; and 122, REGENT STREET, LONDON.
[Illustrated Price Lists Post-free.

see p. 44.

Cover of Feb. 1869 no., in which Osler's first paper appeared. Photostat sent to Dr Maxwell Abbott by Mrs. Leonard L. Mackall in Aug. 1924.

Inserted here in #3535 in 1943
W.W.F.

... interesting particulars, and lettered pages for General Index. Strongly bound, 200 pages, 7s. 6d.; 500 pages, 10s.; and 2s. 6d. extra for every additional 100 pages. Working Catalogues, 1s. 6d. each.

HARDWICKE'S

SCIENCE-GOSSIP

FOR 1869.

HARDWICKE'S

SCIENCE-GOSSIP

1865.

HARDWICKE'S

Science-Gossip:

AN ILLUSTRATED MEDIUM OF INTERCHANGE AND GOSSIP

FOR STUDENTS AND

LOVERS OF NATURE.

EDITED BY M. C. COOKE,

AUTHOR OF "A PLAIN AND EASY ACCOUNT OF THE BRITISH FUNGI," "MICROSCOPIC FUNGI,"
"A MANUAL OF BOTANICAL TERMS," AND OF "STRUCTURAL BOTANY,"
THE "BRITISH REPTILES," ETC. ETC.



LONDON:

ROBERT HARDWICKE, 192, PICCADILLY.

1870.

WYMAN AND SONS,
ORIENTAL, CLASSICAL, AND GENERAL PRINTERS,
GREAT QUEEN STREET, LONDON, W.C.

LIST OF ILLUSTRATIONS.

ABNORMAL FLOWERS, 58–66.
Acerina vulgaris scale, 38.
Acineta tuberosa, 77.
Actinia amethystina, 163 (8).
—— *bicolor*, 164 (3)
—— *capensis*, 163 (5).
—— *dianthus*, 164 (1).
—— *equina*, 164 (7).
—— *Peruviana*, 163 (6).
—— *picta*, 164 (6).
—— *St. Catharinæ*, 163 (7).
—— *sulcata*, 163 (1).
Actinocyclus Ralfsii, 199.
Actinoptychus undulatus, 196.
Agrostemma coronaria seed, 103.
Alopecurus agrestis, 123.
—— *geniculatus*, 125.
American Silk-moth, 223.
Amphiprora ornata, 79.
Amphora arenaria, 183.
Animal from Salt Lake, 51.
Antenna of *Labidocera*, 94.
Antirrhinum majus hair, 247.
Ardea cinerea, 56.
Argemone grandiflora seed, 7.
Argonauta argo, 170, 171.
Ash-buds, 36.
Asterionella Bleakleyi, 193.
Attheya decora, 192.
Aubrietia deltoides hair, 237.
Auliscus sculptus, 197.
Aurelia aurita, 53.
Auriculated Aurelia, 53.

BARREN BROME-GRASS, 130.
Bat's Wing, skeleton, 227.
Beech-buds, 24.
Birds, the Bullfinch, 121.
—— the Heron, 56.
—— the Jay, 225.
—— the Kestrel, 131.
—— the Lapwing, 78.
—— the Ruff and Reeve, 249.
—— the Short-eared Owl, 206.
—— the Siskin, 37.
Bream, scale of, 13.
Bronnus sterilis, 130.
Broscus cephalotes, 141.
Buds of various trees, 24–36.
Bullfinch, the, 121.

CAPE FROGS, 48.
Carpels of *Geranium*, 117–119.
Cartilage of *Petromyzon*, 112.
Caterpillar of *Telea*, 220.
Cephalanthera grandiflora, diagrams of flower, 72.
Cereus gemmaceus, 164 (2).
—— *papillosus*, 164 (5).
Ceylon Bug, 55.
Chærocampa celerio, 208.
Chelifer Latreillei, 211, 212.
Cheyletus, 1.
——, Egg of, 2.
—— and Cheesemite, 4.
——, Head of, 3.
——, Mr. R. Beck's, 5.
Cillenum laterale, 140.
Circæa lutetiana, abnormal flower. 47.
———— ————, normal flower, 46.
Circulatory system of *Dreissena*, 89.
Cocconeis excentrica, 200.
Cocoon of *Telea*, 221.
Collecting-case, 16.
Comactis viridis, 163 (9).
Common Rye-grass, 129.
Coscinodiscus nitidus, 195.
—— *ovalis*, 194.
Crab, four-horned, 133.
Crustacean, Nameless, 76.
Cuckoo-spit larva, proboscis, 82.
Cuttle-fishes, 167–172.

DACE, SCALE OF, 122.
Dendritic Spot on Paper, 52.
Dianthus barbatus seed, 107.
—— *sinensis* seed, 106.
Diatoms, seaside, 173–205.
Digestive System of *Dreissena*, 90.
Diphasia pinaster, 154.
—— *pinnata*, 153.
—— *rosacea*, 151, 152.
Draba incana hair, 238.
Drawing Apparatus, 57.
Dreissena polymorpha, 88.

EEL, SCALE OF, 132.
Egg of Cheyletus, 2.
Entozoon of *Labidocera*, 95, 96.
Ephydra larva, 51.
Epistylis, 54.
Epithemia marina, 191.
Eschscholtzia Californica seed, 9.
—— *tenuifolia* seed, 10.
Eupodiscus argus, 198.

Falco tinnunculus, 131.
Float of *Ianthina*, 22.
Flower, Abnormal, of *Circæa*, 47.
——, Normal, of *Circæa*, 46.
Flowers, Abnormal, 58–66.
—— of Foxglove, Abnormal, 58–60.
Foot of *Ianthina*, 18, 19, 20.
—— of *Obisium*, 217, 218.
Foxglove Flowers, Abnormal, 58, 59.
Fragillaria Crotonensis, 81.
Fringilla spinus, 37,
Frogs from the Cape, 48.
Fungia patellaris, section, 109.

Gammarus locusta and Brood, 142.
Garden Rocket hair, 235.
Garrulus glandarius, 225.
Geophilus subterraneus tracheæ, 41.
Geotria australis, 116.
Geranium molle carpels, 119.
—— *pusillum* carpels, 117.
—— *rotundifolium* carpels, 118.
Gobio fluviatilis scale, 49.
Grammatophora marina, 203.
—— *serpentina*, 204.
Grey Poplar-buds, 31.
Gudgeon, scale of, 49.
Gymnadenia conopsea, diagram of flower, 74.
Gypsophila elegans seed, 105.

HAIRS OF *Chelifer*, 214–216.
Hairs, Vegetable, 231–248.
Halidrys siliquosa, 165.
Hazel-buds, 26.
Head of Cheyletus, 3.
Head of Lamprey, section, 115.
Heron, the, 56.
Hieracium Pilosella hair, 241.
Holcus florets, 127, 128.
Honeysuckle flowers, 63.
Hornbeam-buds, 25.
Horse-Chestnut-buds, 25.
Humble Bee at Home, 39.
Hydrallmannia falcata, 148.
Hypochæris radicata hair, 236.

Ianthina communis, 17.
—— *exigua*, 21.
————, float of, 22.
———— ———— lingual strap, 23.
——, foot of, 18, 19, 20.
Ideal Section, Pennine Chain, 40.
Isthmia enervis, 205.

JAY, THE, 225.

KESTREL, THE, 131.

Labidocera magna, 92, 93.
Lamprey, Head of, 115.
——, respiratory apparatus, 114.
——, the Pouched, 116.
Lapwing, the, 78.
Larva of *Ephydra*, 51.
Leuciscus vulgaris scale, 122.
Lime-buds, 32.
Linaria Cymbalaria hair, 231.
Lingual strap of *Ianthina*, 23.
Live-box, 84–86.
Loligo vulgaris, 172.
Lolium perenne, 129.
Lonicera Periclymenum hair, 232.
Lychnis dioica seed, 104.
—— *Flosculi* hair, 246.

MAGNETIC STAGE, 87.
Maple-buds, 22.
Marsh Foxtail Grass, 125.
Mimulus moschata hair, 242.

NAMELESS CRUSTACEAN, 76.
Nautilus, 170, 171.
Navicula æstiva, 178.
—— *angulosa*, 176.
—— *Clepsydra*, 182.
—— *cruciformis*, 180.
—— *granulata*, 173.
—— *humerosa*, 174.
—— *Lyra*, 177.
—— *rectangulata*, 175.
—— *retusa*, 179.
—— *Trevelyana*, 181.
Nitzschia virgata, 190.
—— *vivax*, 189.
Nose-piece, 15.

OAK-BUDS, 23.
Obisium orthodactylum, 219.
—— spermatozoa, 210.
Octopus vulgaris, 167.
Opium Poppy seed, 6.
Orchestia Deshayesii, 138.
—— *littorea*, 139.
Orchis purpurea, diagram of flower, 73.
Orobanche caryophyllacea hair, 240.
Orthosira punctata, 80.
Owl, Short-eared, 206.

Papaver somniferum seed, 6.
Parasite of *Obisium*, 213.
Peach-flower, abnormal, 62.
Pea-crab, 136.
Peduncles of *Geranium*, 120.
Pennine Chain, ideal section, 40

Peritymbia vitisana, 42.
Petromyzon marinus, cells, 111.
Phronima sedentaria, 50.
Phymactes St. Helenæ, 163 (4).
Pigment-cells, *Petromyzon*, 113.
Pinnotheres pisum, 136.
Pisa tetraodon, 133.
Plantago lanceolata hair, 244.
Platystemon Californicum seed, 8.
Pleurosigma æstuarii, 184.
—— *angulatum*, 187.
—— *Fasciola*, 186.
—— *lanceolatum*, 185.
Plocamium coccineum, 166.
Podosira compressa, 202.
Polycælia profunda, section, 110.
Polygala vulgaris hair, 233.
Pope, Scale of, 38.
Poppy, Opium, seed, 6.
Primula vulgaris hair, 243.
Privet Hawk-moth, 207.
Proboscis, Cuckoo-spit larva, 82.
Pterodactyle, head of, 226.
—— skeleton wing, 229.
Pupa of *Telea*, 222.
Pyrrhula vulgaris, 121.

Retribution on a Cheyletus, 4.
Roach, scale of, 12.
Rudd, scale of, 11.

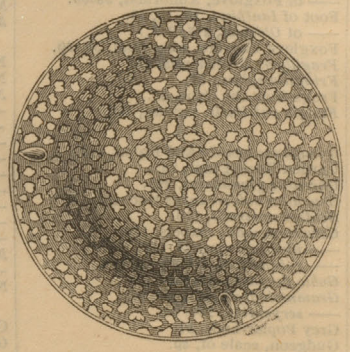
Sagartia coccinea, 164 (9),
—— *rosea*, 164 (8).
—— *viduata*, 164 (4).
Salmon, scale of, 230.
Salmo salar scale, 230.
—— *trutta* scale, 250.
Sandhopper, the, 137.
Saponaria Calabrica seed, 102.
Scale of Bream, 13.
—— of Dace, 122.
Scale of Eel, 132.
—— of Gudgeon, 49.
—— of Pope, 38.
—— of Roach, 12.
—— of Rudd, 11.
—— of Salmon, 230.
—— of Trout, 250.
Scrophularia nodosa hair, 241.
Sea Anemones, 163, 164.
Section-cutter, 14.
Seed, *Agrostemma coronaria*, 103.
—— *Argemone grandiflora*, 7.
—— *Dianthus barbatus*, 107.
—— —— *sinensis*, 106.
—— *Eschscholtzia Californica*, 9.
—— —— —— *tenuifolia*, 10.
—— *Gypsophila elegans*, 105.
—— *Lychnis dioica*, 104.
—— Opium Poppy, 6.
—— *Papaver somniferum*, 6.
—— *Platystemon Californicum*, 8.
—— *Saponaria Calabrica*, 102.
—— *Silene alpestris*, 98.
—— —— *Armeria*, 97.
—— *Stellaria holostea*, 100.
—— —— *media*, 101.
—— *Viscaria oculata*, 99.
Sepia officinalis, 168, 169.
—— —— ovum and embryo, 144, 145.
Sertulariella polyzonias, 149.
—— *rugosa*, 150.
Sertularia abietina, 159, 160.
—— *argentea*, 161.
—— *cupressina*, 162.
—— *filicula*, 158.
—— *operculata*, 155, 156.
—— *pumila*, 157.
Shore-hopper, the, 139.
Silene alpestris seed, 98.
—— *armeria* seed, 97.
Silk-moth, American, 223, 224.
Silver-striped Hawk-moth, 208.
Siskin, the, 37.
Skeleton Wing of *Pterodactyle*, 229.
Slender Foxtail Grass, 123.
Sphæroma serratum, 143.
Sphinx ligustri, 207.
Spider-crab, four-horned, 133.
Spider's foot, 108.
Spirorbis Nautiloides, 134, 135.
Stage, magnetic, 87.
Stellaria holostea seed, 100.
—— *media* seed, 101.
Strix brachyotus, 206.
Surirella Capronii, 43,
——————, sections, 45.
——————, var., 44.
Sycamore-buds, 34.
Symphytum officinale hair, 234.

Talitrus locusta, 137.
Telea Polyphemus, ♂ ♀, 223, 224.
Thuiaria thuia, 146 (7).
Tingis hystricellus, 55.
Toxonidea Gregoriana, 188.
Tracheæ of *Geophilus*, 41.
Tradescantia zebrina hair, 245.
Tropæolum majus, peloria, 75.
Tricératium alternans, 201.
Trout, scale of, 250.

Vanellus cristatus, 78.
Verbascum Thapsus hair, 239.
Vine-insects, 42.
Viscaria oculata seed, 99.

Wayfaring-tree-buds, 24.
White Beam-buds, 21.
Wing of Bat, 228.
Wych Elm-buds, 33.

Zoophytes, Sertularian, 146–162.



THE STORY OF A PIECE OF COAL.

By J. E. TAYLOR, Hon. Sec. Norwich Geol. Soc., etc.

CAN any of my listeners form any idea of what a million of years means? It is very difficult, I grant, but I cannot give any more definite conception of my own great age than by saying I am many millions of years old. You must therefore take it for granted that all this immense lapse of time has occurred since I was born. Before I attained my *majority*—that is to say, before I became really and positively *coal*—I had existed in manifold forms, more numerous and varied than the metamorphoses of the butterfly. You cannot hit upon a greater mistake than to suppose I was originally made just what you now see me—a jetty mass of mineral. The doctrine of metempsychosis, said to be held by the Hindoos, would apply almost literally to my own biography. You may trace my career through a hundred different stages, each more widely various than the other. Nay, the process of elaboration through which I have passed is so complex that I may well be forgiven if I have not a clear recollection of it myself.

I am English born and bred, notwithstanding the tropical character of my antecedents. In some measure, it may be thought that I hardly partake of English characteristics as regards the climate which affected my earlier career; but I can assure you I was never once removed from British ground In the distant ages to which I have briefly referred, my recollections go back to waving forests of tree-fern and gigantic club-mosses, as well as to a thick underwood of strange-looking plants. The name now given to this formation by geologists is termed the Carboniferous, and you may form some idea of the ages which have flowed away since then by the fact that no fewer than *nine* subsequent distinct formations and periods occurred. These are known as the Permian, Triassic, Liassic, Oolitic, Cretaceous (or chalk), Eocene, Miocene, Pliocene, and Quaternary, to say nothing of the epoch comprehending the human race. To make myself still more clearly understood, it is necessary to state that the formations *newer* than that to which I belong attain a vertical thickness of more than fifty thousand feet! All this mass was slowly formed by gradual deposition along old sea-bottoms, whilst a more than equivalent period of time was taken up in the upheaving and other processes which have elevated these rocks into their present position!

The climate and geography of Great Britain were very different from what they now are when I was born. You must imagine a soft balmy temperature, neither too hot nor too cold, and lacking those extremes which at present characterize the seasons. There was no great necessity for extreme heat—rather it was most important to the growth of a luxuriant vegetation to be free from cold. There were few ranges of hills or mountains, for these always cause a refrigeration of the atmosphere by condensing the clouds; thus hanging the sky with a curtain which shuts off a great deal of solar heat. True, right across what is now central England, there stretched a hilly barrier, which separated two coal-formations going on contemporaneously. Scotland and Wales were also then widely different from what these countries are at present. Instead of the grand mountainous scenery they now possess, we had long-extended saline mud-flats, thickly studded with trees now extinct, and known to the geologist by the names of *Sigillariæ*, *Lepidodendra*, and *Calamites*. In fact, all the district now considered as "coal-yielding" was then similarly circumstanced. The entire area had a geographical condition similar to the marine swamps which now fringe the coast-line of the Southern States of America. To these

the slowly ebbing and flowing tides had access nearly twice a day. Around the more aged trunks of these extinct trees, standing on a muddy, shallow sea-bottom, so to speak—marine worms clustered, and their coiled tubes are now occasionally found fossilized, along with the petrified vegetation to which they clung when in life. These *Spirorbi*, as they are commonly termed, are tolerably plentiful in the north of England. It was owing to the semi-marine, semi-terrestrial character of the area on which the luxuriant vegetation of the Carboniferous period grew, that we now find so many fossil mussels and other marine shells imbedded in the same strata.

I am told that chemists nowadays have discovered only one atom or particle of carbon associated with every thousand of the other gases forming the atmosphere. The atmosphere of the period when I was born hardly contained more. This small quantum was absorbed by the waving forests into their structure, and thus added to their solid bulk. Day by day, and year by year, each individual tree grew, so that the mass of solidified carbon increased, but without exhausting the original store. This was constantly being furnished by volcanoes, as well as by the lowly animals of my own time. Everything, they say, is composed of minute and cellular parts, and originally my atoms freely floated in the air as so many particles of carbon. This was before I had entered into that combination which made me part and parcel of a living tree. Once having been sucked into the leaf-pores of a *Lepidodendron* or *Sigillaria*, I started existence under a new form. I became subject to those unknown laws of vital force which philosophers find so great a difficulty in explaining. I had now an active duty to perform, and had to assist in the growth and well-being of the tree in whose bulk I lay. But this did not prevent me from noticing the many strange objects which surrounded me. Human beings there were none, nor did the race to which I am now so useful an auxiliary appear upon the earth's platform for millions of years afterwards. Tree lizards, not very much larger than those which haunt the sunny banks of old England, climbed up and down the sculptured branches of the forest trees, and lived upon the marsh flies and beetles, whose "drowsy hum" was the only sound that broke upon the stillness of these primeval woods. They found a shelter in the hollow trunks of *Sigillariæ*, in association with the pupæ of beetles and other insects. In some places they have been found fossilized together,— a conserved recollection of those bygone times. Great reptiles, much resembling a frog, only as large as a small ox, waddled to and fro over the extensive beaches, and left their enormous hand-like impressions in myriads upon the yielding mud. As such they are now found in the flaggy sandstones which compose the strata of the coal formation. Occasionally, when overtaken by death, their carcases rotted on the shores, and were imbedded in the sands, to be found in long-subsequent ages in a fossil state. Several species of these gigantic batrachians existed contemporaneously. Very frequently the salt-water reaches were visited by alligator-like animals, now termed *Archægosaurus*, whose bodies were covered by hard, horny scutes or scales, held together much after the manner a slater now adopts when he tiles a house. These reptiles were five and six feet long, and, together with the great frogs I have mentioned, were the principal and most powerful animals of the age I am speaking of. The atmosphere differed little from its present condition, being neither denser nor more rarified. This you may prove for yourself by the impressions of rain-drops preserved in the Carboniferous sandstones. The great drops were driven by the wind aslant, so that even now there is indicated the very quarter from which the wind blew at the time! The passing shower over, the sun peeped forth from behind the dark clouds, and his heat baked the mud, and cracked it, just as he does now the bottom of a clayey pond. These sun-cracks were subsequently filled up, sometimes by sand of a different colour, so that they are fossilized as truly as the shells and plants. The same sandstones yet bear the trail-markings which the marine worms left after they had crawled over them when in a soft state. Occasionally you may even come across their burrows or holes; whilst the flagstones also are impressed with ripple-marks left by the retreating tides!

Although the sea-bottom was so shallow in the neighbourhood of the great forests, I should state that many miles further out it gradually shelved deeper, until there was an area where "blue water" was attained. Here the sea was fairly alive with animals of all sorts of natural history orders and classes. Coral banks, with animals putting forth their beautifully coloured tentacles, more various than the rainbow hues, stretched over many leagues of old Devonian rocks, and, as the area was slowly submerging at the time, their united labours, in the course of ages, produced no small portion of what is now termed the "Mountain Limestone." Shell-fish, allied to the existing nautilus, found in these purer waters, free from land sediment, the essentials of their well-being. In the limestones which their dead shells helped to form there are no fewer than thirty different species of nautilus! They had relatives termed *Goniatites* (long since died out, for they did not possess the hardiness of their congeners), whose chambers were fashioned in a zigzag or angular manner. Then came another group of shell-fish, equally near by blood, the *Gyroceras*, whose coils did not lie so closely together as those of the nautilus. One other class of cephalopods are now known as *Orthoceratites*. They were also chambered, but

were straight instead of being coiled. The limestones of this age are crowded with immense numbers both of species and individuals belonging to these genera. Of them all the *Orthoceras* was perhaps the most dreaded, partly on account of its size (some of their shells being three feet long, and as thick as a man's leg), and partly on account of their voracious habits. Fancy them, as I have frequently seen them, with their last chamber surrounded with a fringe of long arms, each of which was furnished with suckers that would indicate no slight danger to bathers nowadays! Hundreds of thousands of these creatures existed. Indeed, they were the scavengers of the Carboniferous seas, eating up everything that came in their way, and perhaps not particular about preying upon a weakly brother when appetite prompted them. In Scotland, in many parts of the limestones formed at this time, the strata, for hundreds of feet in thickness, are composed of hardly anything else but the accumulated shells of *Orthoceratites!*

At the bottom of the sea in which these cephalopods lived and flourished there were gathered together immense shoals of a peculiar shell called *Spirifera*, now extinct. Scores of species of this particular shell lived and died there, for it was the period when the family attained its maximum of existence. In fact, they occupied the place in those earlier seas that cockles and mussels do now. Their anatomy was very peculiar, each shell-fish being furnished with a peculiar coiled-up apparatus which it could protrude so as to produce currents that brought to it its food. Small, but beautiful crustaceans, of a race then fast dying out, still swarmed the waters. Formerly they were known as *Trilobites*—those of this age are christened *Phillipsia*. Their family had exercised a sort of molluscan oligarchy during previous geological epochs. But the Carboniferous period saw the last of the race, and its limestones became their tomb. I am told that the geologist knows few fossils more beautiful than these little trilobites. The cream-coloured matrix in which they are imbedded, and the perfect and ornate characters of the fossils themselves, cause them to be greedily collected and much admired. In the same sea were hundreds of species of shells besides, all of which thronged together to enjoy a common life; but to mention them separately would be to convert my story into a tedious detail. I should be lacking greatly in memory, however, if I were not to mention a most abundant and peculiar family, allied to the star-fishes and sea-urchins of the present day—I mean the *Crinoids*. The common feather-star of recent seas most resembles the upper parts of these extinct animals. But the tentacles of the latter were longer, whilst each was subdivided into branches. When at rest, these closed around the body like the petals of a tulip. Again, each was fastened to a jointed stem, which anchored itself by roots to the sea-bottom. Submarine forests of these crinoids covered many square miles of the rockier portions, and their graceful outlines and motions in the water, as well as their bright colours, were sufficient to induce admiration. In Derbyshire the limestone is almost entirely composed of their broken and aggregated stems.

As these dead shells and other animal remains accumulated along the ocean-floor to form a limestone that should afterwards be easily identified by their imbedded forms, almost every individual was coated by minute sea-mats. No Honiton lace of the present day ever excelled in grace and elegance that which belonged to these lowly animated beings. In the solid masses of the Carboniferous limestone you may now find them festooning shells and corals; and few objects afford greater delight to the geologist when he comes across them. The *single* corals also—that is to say, those which did not grow in reefs, but lived solitary on the sea-bottom—were not inferior in beauty to any now existing. Their fringe of gorgeously coloured tentacles made them appear like so many animated flowers; and thus the dark caves of ocean then bore many a flower that was born to blush unseen. Slowly, through countless myriads of years, the Carboniferous limestone increased to its present thickness, principally by the accumulation of dead shells! The sea-water contained more or less of carbonate of lime, which the shell-fish absorbed in order to build their dwellings, just as the trees did carbon that they might form wood. In this way the minute particles became ultimately condensed into rock masses. Meantime, the water was animated by little creatures that would have evaded human eyesight, although their forms were not a whit less elegant and graceful than those of their larger neighbours. Their tiny shells fell to the sea-bottom, and there formed a limy mud, which acted as a fine cement for the bigger fossils. As time passed on, the sea actually became shallower, by reason of the vast numbers of organisms lying on its floor. The weight of sea-water pressed them into a solid limestone rock, such as you now behold it. Can you wonder, after this, that such a deposit should take a high polish when worked, or that the marble thus produced should be speckled and marked by so many strange forms as you see it in your mantelpieces or pillars?

In the shallower waters of the sea, and sometimes even in the marine lagoons where the trees grew, multitudes of strangely-clad fishes swarmed. The largest of these, the *Megalichthys*, or "great fish," possessed characters which linked it to the reptile family. Its teeth and jaws rendered it a formidable assailant, and its powerful build and rapidity in swimming made it the terror of its neighbours. In fact, the "great fish" occupied a place among the fishes of its time similar to that held in modern

rivers by the pike; its size, also, averaging about the same. Time, however, would fail me to enumerate the various kinds of fish that lived in the same epoch that I did. From four or five feet in length, to thousands no bigger than the common stickleback, all were covered with enamel plates instead of horny scales. Indeed, horny-scaled fishes did not come into existence for ages afterwards. In many parts of Lancashire, in the shales which overlie the coal-seams, these shining enamelled plates may be turned up by the thousand. The smaller fishes haunted the shallower lagoons overhung by club-mosses and ferns, and the dim light that broke through these was often reflected from the sheeny mail of *Palæonisci*, as they wantoned and gambolled, unaware of "great fish" lying near. When the muddy bottoms of these reaches and lagoons became afterwards hardened into coal-shale, the dead fishes lying there, whose hard covering had protected them from decay, were entombed and passed into a fossil state.

But what tongue can describe the vegetable wonders of the forests where I grew? The woods were so thick, and the gloom so impenetrable in consequence, that it required a keen eye to make out individual peculiarities. Fancy *Lepidodendra* four or five feet in diameter, and as much as fifty or sixty feet high, and yet nothing but gigantic "club-mosses"! Their long leafy ribbons waved like the leaves of the aspen, and, where these had fallen off, the bark was most gracefully and geometrically reticulated from their attachment. Thirty or forty different sorts of these immense club-mosses existed at the same time, each characterized by different leaves and bark. The gigantic *Sigillariæ* were nearly related to them, the main difference being their longer leaves, straighter stems, and the larger marks made on the bark. The roots, also, of this latter class of trees were very peculiar, and stretched through the mud on every side, seeking a firm foundation for the tree to which they belonged. Shooting many feet above these great club-mosses were huge "mares'-tails," as easily distinguished from the rest as the wavy poplar nowadays is from oak and elm. These are called *Calamites*, and truly they were extraordinary objects. You have only to magnify the little "mares'-tails" growing in ditches until you see them fifty and sixty (or more) feet high, and you would have the best restoration of these Calamites that could be imagined. There were many species, characterized by fluted joints, and by difference of foliage. Here and there, but more sparsely scattered, were graceful tree-ferns, whose former fronds had left great scars on each side the trunk. The higher grounds were occupied by peculiar species of pine, bearing great berries as big as crab-apples. The humid morass was densely covered by a thick underwood of smaller ferns, which grew there in rank abundance. The equable temperature, rich soil, and humid atmosphere were just the needful accessories to the growth of vegetation of the class I have mentioned. It consequently flourished at a rate of which we can form but a poor idea from the present. The accumulated trees, ferns, &c., were very great, and these gathered in immense quantities over the entire area. I mentioned before that there was a slow sinking or submergence going on. Well, occasionally, the tides brought up silt and strewed it over the decomposing vegetation. In fact, many of the forests were actually buried thus, and their trunks are frequently met with standing erect in solid sandstone rock. But though the covering-up of the vegetation prevented the liberated gases from escaping, it also obstructed for a time the growth of other trees. The latter could not well flourish on sand-banks, and so they were limited to conditions elsewhere similar to those I have mentioned. But as time elapsed, the old circumstances returned. Another forest grew on the site of the older, to be buried up in its turn. During countless ages this alternate growth and covering-up went on, until in some places, as in the South Wales coal-field, there are no fewer than one hundred different seams of coal!

After this vegetation had been thus collected, chemical changes began to take place. The mass heated and turned black, just as a stack of hay does now when it has been packed in a damp state. By-and-by, it was transmuted into a pulpy condition, wherein almost all traces of vegetable structure became lost. It afterwards changed into a solid sub-crystalline mass, and obtained the jetty, semi-cubical character it now presents. As many of the tissues of coniferous trees contain more or less of silex, which is indestructible, it follows that when coal is burned, this drops out of the grate as a white ash. When the microscope is applied to it, the peculiar spiral and dotted vessels of these ancient trees are plainly visible. But notice the associations which cling to a piece of coal! It represents a more solid condition of carbon than is to be found in mere wood. And here I should state that though various conditions of fossil fuel are met with, from green wood to culm and anthracite, their vegetable origin is never once lost sight of; whilst chemistry steps in with an easy statement of how these changes occurred! The ancient vegetation of the Coal period grew by virtue of the stimulus of the sun-light. The heat and light induced growth, and thus even a piece of coal represents so much fossil sunshine! And now, when men light their fires or manufacture their gas, they are but setting free the light and heat of the sun which poured down on the old Carboniferous forest, and were stored up by the vegetation in their tissues. Nay, more, botanists will tell you that the three primary colours of light are sure to be developed at some time or another in the history of every plant or tree—in the blue and

yellow which form the green of the leaves, and in the red of the fruit or russet of the bark. Just so with the fossil vegetation termed coal. The very aniline colours which are obtained from coal tar are nothing more or less than the restoration of the primary colours which the ancient vegetation stored up from the light! Such is a portion of my history, briefly sketched; but the broad traces of design manifested in my preparation are too palpable to be overlooked. The age in which I was born was a special one, like to none other which went before or came after; and it is to me that modern progress is indebted. In my mass is stored up a force that saves the wear and tear of human muscle and sinew, that does away with the fearful toil which makes simple slaves of men, and enables them to gain daily bread by easier means. But through the vast ages during which I have been silently stowed away, plutonic disturbances have repeatedly broken through and cracked the solid strata, and have thus brought them to the surface to enable men to work the coal they contain. Meantime life in its manifold phases has never once been absent; whilst its upward progression culminated in a being endowed with moral and mental as well as physical perfections, and it was for him and his kind that I was specially prepared, to surround him with the means of social happiness and comfort, and to enable him to rise higher in the scale of intellectual being.

CHEYLETI.*

THESE arachnids, some species of which, according to the "Micrographic Dictionary," are found in books and museums, are thus described in that work:—

"Rostrum prominent, palpi thick, resembling arms, and falciform at the ends, antennal forceps (mandibles?) didactylous."†

My acquaintance with them began in the early part of December 1866, when I was searching in a cellar for microscopic curiosities, chiefly Poduræ. To the naked eye they appeared as little orange-coloured mites‡ on the surface of the damp wood and amid the spiders' webs, &c.§ A lens revealed something of their outline, and I thought I recognized certain characteristics of the creature so ably described by Mr. Richard Beck in the *Journal of Microscopical [Science* as "a new species of acarus," whose agamic reproduction offered an interesting field for study. Accordingly I eagerly collected all the specimens I could, amounting to about eight, and prepared to watch them in confinement. Like Mr. Beck, I soon found that the Cheyletus was partial to a diet of cheese-mites; so in a supply of these my captives were speedily indulged. After coursing round and round their prisons, seeking in vain for a means of escape, the Cheyleti at last settled down to a quiet life, dividing their time between satisfying their appetites and laying eggs. Both these processes were extremely curious, and displayed a degree of intelligence which to me seemed surprising in so minute a creature. The hungry Cheyletus would start forth from its hiding-place in the cell, the first pair of legs (which, by the way, in some species are never used to walk upon) extended as if groping. As I cannot discover any eyes in the creature, I am led to conclude that this is the sole function of the first pair of legs. Their branched structure favours this inference. By-and-by, after poking them into various holes and corners, they would touch a



Fig. 1, Cheyletus, × 30.

moving cheese-mite; I say *moving*, because if the cheese-mite remained still, it seemed to escape the notice of the Cheyletus altogether, even though it were repeatedly touched by these groping organs. But if it moved, the Cheyletus actively turned itself in that direction, placing its head at right angles to the cheese-mite's body, and lowering it towards the mite's legs; then it suddenly seized hold of a leg with the mandibles and falces, the former piercing, and the latter holding it steady. Having made an aperture in the skin of the mite, the Cheyletus proceeded to suck into its own body the contents of that of its prey. With a two-third inch objective the passage of the fluids by constant jerks down the leg of the mite, and into the Cheyletus could be clearly seen. Unless greatly disturbed, it would not relinquish its hold till its appetite was satisfied, but it would carry or drag the mite with it as it retired from suspected danger. Whether the bite of the Cheyletus is venomous to the cheese-mite, is an open question—Mr. Beck thinks it is venomous. Anyhow, the mite ceases to move in about a second after it is bitten, doubling up its legs immediately,

* Read at the Quekett Microscopical Club, 23 Oct., 1868.

† Micrographic Dictionary. ‡ Possibly the species is *new*.

§ [*Cheyletus venustissimus* (Koch.) is an orange species found in stables, &c., which this somewhat resembles.—ED.]

as if paralyzed. After the meal is despatched and the shrivelled-up skin of the mite is cast away, the Cheyletus returns to the spot in the cell which it has appropriated as its home, and prepares to deposit an egg. Before and after doing this, it is at great pains to spin threads (apparently from its mouth) crossing each other in various directions at one point, to prevent the egg rolling away from the selected spot, and also to afford the young Cheyletus, when hatched, some slight protection. The young (as with acari in general) have only six legs, and they remain, for some little time after leaving the egg, under the shelter of the silken cords which formed its support before it burst.

The cheese-mites that were enclosed in the cell with the adult Cheyleti, being hunger-pressed, commenced their depredations on the eggs of their

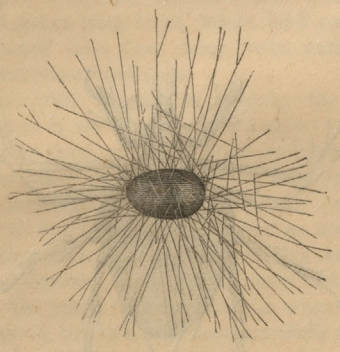


Fig. 2. Egg of Cheyletus, $\frac{2}{3}$ in. and A eye-piece.

enemies, and were so successful in this undertaking that from the early part of December till the end of January, when the mites were in much diminished force, not one of the eggs of the Cheyleti, though many were laid, was suffered to hatch. They all disappeared under the mandibles of the cheese-mites, whose voracity till then I was not well acquainted with. One even had the temerity to attack an adult Cheyletus, and was successful in the attempt. Somehow it got round to the rear of its enemy, and, having thus obtained the advantage, it made the most of its opportunity, by climbing up and then cutting furrows in the unfortunate prisoner's back, and transferring the fragments of viscera to its own interior economy, till at last the Cheyletus gave in, and submitted to its fate. After the captor had glutted itself, it left the prey quivering in agony, and waddled off. When I took another glance, two hours afterwards, five other cheese-mites were busily occupied clearing away the remains of the feast, and they steadily persisted till nothing but the horny feet and mandibles remained. These they rejected; and I observe they always leave these parts uneaten after a cannibal feast, which is not an unfrequent occurrence in the life of our friend *Acarus domesticus*.

About the middle of February the eggs of the Cheyleti were hatching too rapidly for the cheese-mites to keep down the race effectually, and it was most interesting to witness the early development of ferocity towards cheese-mites in the young Cheyleti. They would attack individuals much larger than themselves by gripping the cheese-mite's leg fiercely, and keeping hold long enough to obtain some slight nutriment from the juicy prey. In almost all cases, however, a few kicks compelled

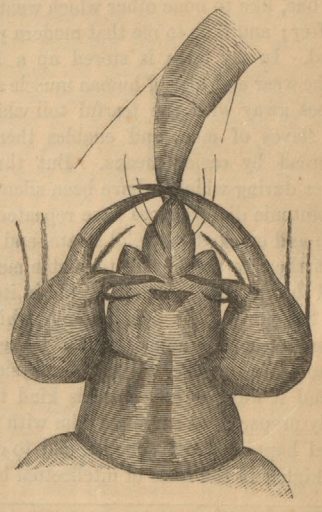


Fig. 3. Head of Cheyletus; mandibles holding leg of Cheese-mite, $\frac{1}{4}$ in. obj.

the young tyrant, whose strength was not equal to its desires, to relinquish its hold very soon. An hour or two afterwards it would try again, and successfully obtain some refreshment after a similar struggle. Thus these little mites prolonged their existence, and gradually grew larger.

The conduct in confinement of this Cheyletus, which, from comparison with Mr. Beck's drawings, I take to be a distinct species from that he describes, is probably just the same in its natural state. I generally notice it in the dark cellar alluded to, either in some crevice in certain pieces of wood, or protected by an old forsaken spider's web; and in its neighbourhood I observe, often in considerable numbers, an active species of mite, certainly not a cheese-mite, but probably the species figured in Hogg's book on the microscope as a flour-mite. Occasionally I have caught a Cheyletus in the act of making a meal off one of these.

But it seems to me that the Cheyletus is by no means *restricted* in its diet to one species of acarus, for in confinement I have observed it devouring several. Not long ago a person called my attention to a large birdcage, which was much infested by the bird-mite (*Dermanyssus avium*). A close examination of the nests of that creature revealed a mass of mites of all sizes, their cast skins and eggs,

and also numerous Cheyleti, which had so freely imbibed the contents of the bodies of the Dermanyssi as to acquire their colour,—a very deep red, almost black.

These remarks would be extremely incomplete if no allusion were made to the species of Cheyletus that Mr. R. Beck described, and which I have lately been fortunate enough to find. The three or four specimens which came in my way had taken up their abode on the cover of a book that had lain in a cupboard for about a year undisturbed. They were each sitting on the top of a small heap of eggs in various stages of development, some being already hatched, and some only just laid. At short distances off, also, on all sides, there were numerous cast skins of the creature, and discarded remnants of unlucky acari that had fallen a prey to them.

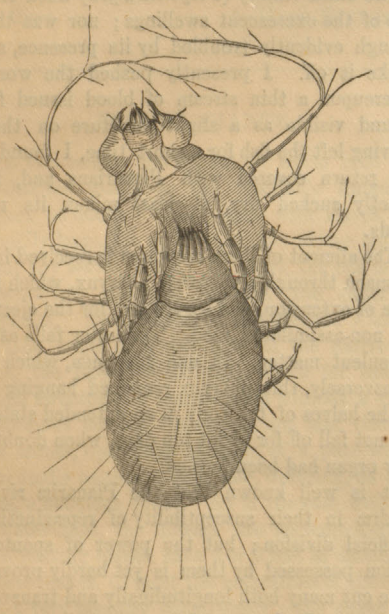


Fig. 4. Retribution on a Cheyletus by a Cheese-mite.

The most remarkable and interesting discovery in connection with this Cheyletus was the fact that he obtained several generations from the first individual, without the intervention of a male, leaving the question, "whether the creature is really hermaphrodite, or whether, as with Aphides, one act of fertilization by the male produces an indefinite series of generations?" to be decided by some expert microscopic physiologist in the future.

He says, "On July 10th of this year, a young acarus of this species was taken from a trap, in which there was only a mature female; it was completely isolated, and on the 29th of the same month it laid eggs, which hatched on the 4th of August. One of these on the day it was hatched was removed to a trap, and also completely isolated; by the 13th of September it had laid eggs, and some had hatched. On the 19th of September, two of the young from the last-mentioned trap were separated and secured. Since then, one of these specimens was killed; the other laid eggs, which hatched on the 29th of December, and one of these young ones is still alive, but isolated in the same way as its predecessors.

"The securing a succession of three generations, including some accidents, has with me extended over a period of about five months, and I am quite prepared to admit that the proof of agamic reproduction in this acarus would have been more satisfactory if continued through a longer period; but after reading Professor Huxley's paper on the Agamic Reproduction of Aphis, in part of which he states that 'in Myriapoda and Arachnida the process is not known,' I have thought that the few facts I have just given were of sufficient value to bring before your notice." *

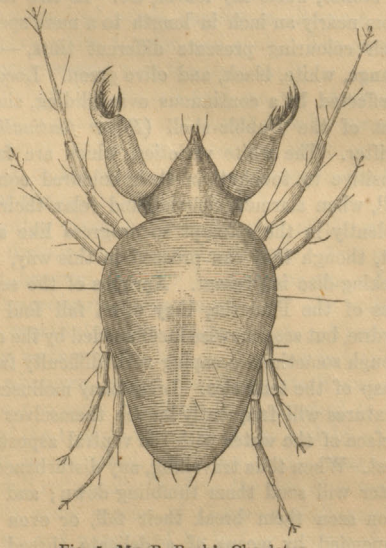


Fig. 5. Mr. R. Beck's Cheyletus.

This Cheyletus has shorter legs than the other that I have alluded to in the early part of my notes; it has a smoother skin, and its palpi and head are much larger relatively to the rest of its body. It also is of a paler yellow; but it is possible that the colour may be greatly influenced by its diet. The first pair of legs are more highly developed as organs of locomotion than in the other species, but it appears, notwithstanding, to be less given to roaming about. As it has been in my possession but a few days, I have not been able to verify the observations of the distinguished microscopist I have quoted; but at some future time I may be able to communicate further information.

S. J. M'INTIRE.

* *Journal of Microscopical Science.*

FRESH-WATER PLANARIÆ.

THESE little Flat-worms, common as they are, have been little noticed among the numerous objects which come under the aquarium-keeper's eye; and, with the exception of Mr. Ray Lankester's paper in the *Popular Science Review*, I can find no systematic account of their habits. I have therefore set down the following disjointed notes of my own, in the hope of suggesting a more extensive history to others who have greater facilities for observation than I possess.

The Planariæ, which are included in the class of Flat-worms (*Platyelminthes*), and are members of the order Tushellasia, may be found abundantly in our streams and ponds, either gliding about or clinging in a quiescent state to the inferior surfaces of stones, water-lily leaves, &c. In size they vary from nearly an inch in length to a mere speck, and their colouring presents different tints, — rufous, orange, white, black, and olive green. Locomotion is effected by a continuous over gliding, similar to that of the Bubble-shell (*Physa fontinalis*), but swifter. The white varieties, which are far more sensitive to touch than their coloured congeners, will, when alarmed, contract and relax their bodies violently in the attempt to progress like a leech, but, though they can proceed in this way, no true sucking-disc is present. Apropos of the sensitiveness of the Planariæ, they often fall foul of the Hydræ, but seem nowise incommoded by the contact, though sometimes escaping with difficulty from the grasp of the tentacles. Like many molluscs, these creatures will frequently launch themselves on the surface of the water with the ventral aspect uppermost. When thus travelling, any disturbance of the water will send them tumbling down; and I have often seen them break their fall, or even remain suspended by means of a delicate thread. This cord is probably spun, as Dalyell and others mention spinnarets as present in some species; but it may be due merely to the mucous secretion which covers the body and causes the fingers to adhere slightly after handling a Planaria. They are active night and day; but if the weather be cold they contract themselves and cling to sheltered stones or bury themselves in the ooze. In the absence of such shelter they suspend themselves from the surface of the water, much as the hydra is wont to do, by hollowing the ventral aspect into a kind of boat. The Black Planarians may be found in cold weather huddled together in great numbers and in almost any water; for they are by no means particular in the latter respect, and will bear changing from fresh to putrid water without injury. I have not observed, however, that the fresh-water species enter the brackish water at the mouth of the same river; and on transferring some individuals from fresh to slightly brackish water they apparently lost all power of locomotion, feebly erecting themselves on either extremity and writhing about. They were dead on the expiration of ten minutes; and, curiously, they became tough and shrivelled like shreds of leather, though naturally of a semi-gelatinous consistency.

In common with the hog-louse (*Asellus*) and the fresh-water shrimp (*Gammarus*), the Planaria plays the *rôle* of scavenger. A dead mollusc is speedily black with feasters; and on one occasion I found them attending the funeral of a relative, when, the orthodox "baked meats" not being forthcoming, they devoured their deceased friend. At another time a living stickleback was attacked. The fish in question was affected with a disease in the form of white glandular swellings. Being placed for a few minutes in a jar containing Planariæ, an individual of the black variety (*Polycelis nigra*) fixed itself on one of the excrescent swellings; nor was the fish, though evidently troubled by its presence, able to shake it off. I presently pushed the worm off, whereupon a thin stream of blood issued from a wound visible as a slight puncture on the ball. Having left the fish for a short time, I found it on my return covered with Planarians and, if not exactly sucked dry, at least minus its natural fluids.

The aliment of these creatures is received into the stomach through a suctorial pharynx, which is capable of extension, and serves also for the ejection of the non-assimilated food. The latter falls as white flosculent matter. In one specimen, which I cut transversely, this pharynx remained hanging to one of the halves of the body in an extended state, and did not fall off for about ten days, when doubtless a new organ had been formed.

It is well known that the Planariæ rival the Hydræ in their susceptibility of reproduction by artificial division; but the power of spontaneous fission possessed by them is yet hardly proved. I have cut many both longitudinally and transversely, and severed them partially or wholly, and they usually formed perfect animals, but I have not witnessed an instance of spontaneous separation; nevertheless the white species (*Planaria lactea*), after being partially crushed, will discard the wounded portion, and supply its place by a fresh growth. The same species, if the frontlet be slit so as to form two heads, presents a strange sight, each head striving to pursue a separate course, which is mostly diametically opposed to that of the other.

A slight sketch of the characteristics of the commoner species may be found in the "Micrographic Dictionary," where, in addition to the black and white varieties, a dark grey species (*P. torva*) and a dusky-brown species (*P. brunnea*) are mentioned. These are essentially similar in habits to the Black Planaria, but are more locally distributed. Besides these I have found several of an olive colour, which

are of large size, very broad in proportion to the length, and show a rudely dendritic "water-vascular" system. This variety is much less active than the above-mentioned, and far less abundant. Like the White Planaria, it has the habit of puckering its body into folds when at rest.

It has been a matter of doubt whether the Planariæ possess the faculty of sight, although they exhibit eye-spots varying in number from two to sixteen, and even more. I incline to think they do derive some aid from these eyes in their progress. In a jar in which my Planariæ are kept, the weeds hang above a large stone, up which the worms crawl, and, immediately lifting up their bodies on the posterior extremity, they pass on to the overhanging weed without pausing or feeling about for a hold; thus proving that they are conscious of the presence of the weed, though it is nearly half an inch above them. A. HART EVERETT.

FLORAL GIANTS.

THE two largest flowers in the world hold very distinct places in the vegetable kingdom; inasmuch as one is a water-plant with leaves proportionally large, the other a parasite on tree trunks, without any leaves at all. In short, the one is the representative giant of aquatic, the other of land plants. The aquatic is the elegant *Victoria regia* (the *Irupé* or water-plate of the natives of Guiana, the Royal Water-lily), which for beauty, size, and sweetness of scent stands without a rival. Its enormous flowers, measuring not less than 15 inches across, open each evening, of a pure white, but gradually assume a pink hue, diffusing, as they mature, a delicious odour. As is the case with our own water-lilies, the flowers are accompanied by several floating leaves, each 5 or 6 feet in diameter: but these leaves, to meet the necessities of the case, are of a very peculiar construction: the edges are turned upwards, forming a ridge 3 or 4 inches high the whole way round, giving the leaf the appearance of a huge platter. The lower surface, which is of a purplish-red colour, is traversed in every direction by stout projecting ribs, strengthening the material of the leaf to an incredible extent.

This glorious plant, an inhabitant of the Amazon and some of its affluents, was first discovered by a German traveller, Thaddeus Haenke, in 1801; it was soon after seen by Bonpland, but was first described by Pöppig in 1832, and named by him *Euryale Amazonica*. Five years later Sir R. Schomburgk again fell in with it in the river Berbice, and from the examination of specimens sent home by him it was removed by Professor Lindley from the before-named genus and re-named *Victoria regia*. Schomburgk describes so graphically his feelings on first encountering this stately plant, that I cannot resist inserting the passage:—

"While contending with the difficulties that nature opposed in different forms to our progress up the river Berbice, we arrived at a point where the river expanded and formed a currentless basin. Some object on the southern extremity of this basin attracted my attention. It was impossible to form any idea of what it could be; and animating the crew to increase the rate of their paddling, we were shortly afterwards opposite the object that had raised my curiosity—a vegetable wonder! All calamities were forgotten; I felt as a botanist, and felt myself rewarded: a gigantic leaf, from 5 to 6 feet in diameter, salver-shaped, with a broad rim, of a light green above and a vivid crimson below, resting on the water. Quite in character with the wonderful leaf was the luxuriant flower, consisting of many hundred petals, passing in alternate tints from pure white to rose and pink. The smooth water was covered with the blossoms."

Sir Robert has himself told me the story in a similar strain, and has mentioned how he has seen large heavy water-birds standing, three or four together, on the broad leaves, supported by the network of ribs on the lower surface.*

The other giant, *Rafflesia*, has none of the graces which distinguish the lovely *Victoria:* it is noteworthy, however, both for its enormous size and for the extraordinary circumstance that the solitary flower constitutes the whole plant. There is literally neither stem, branch, leaf, nor in fact any organ whatever, except the flower itself and the rootlike processes by which it is attached to the trunk of the tree on which it grows and by whose juices it is nourished. Let the reader imagine a great dull red corolla fixed to the side of a tree—generally some species of *Cissus*—undistinguished by a stem and unrelieved by leaf or verdure of any kind, and he will have some notion of this singular production of the islands of the Indian Archipelago.

Clifton. W. W. SPICER.

LOCAL NAMES, whether of birds, beasts, or fishes, and of all vegetable organisms, will be of service if sent either to Mr. James Britten, of High Wycombe, or Mr. Robert Holland, of Mobberley, Knutsford, Cheshire.

* It is worth recalling to mind that the late Sir J. Paxton, the architect of the Great Exhibition building, 1851, borrowed his plan of construction from the leaf of the Victoria. He says: "It was here (Chatsworth) that this singularly beautiful aquatic flowered for the first time in this country, on Nov. 9, 1849. You will observe that Nature was the engineer in this case. If you examine this and compare it with the drawings and models, you will perceive that Nature has provided it with longitudinal and transverse girders and supporters, on the same principle that I, borrowing from it, have adopted in this building."

ASSOCIATION FOR THE PROTECTION OF SEA-BIRDS ON THE ENGLISH COAST.

IT is well known that the English coast, on some of its loftiest cliffs and boldest headlands, has from time immemorial been the favourite haunt—during the breeding season—of a variety of gulls and other sea-birds; and so long as railways, steamers, and other means and motives of locomotion did not invade their privacy, they were secure from all but those smaller chances of loss arising from the occasional visit of a sportsman or a tourist.

Those days of seclusion and security are now, unhappily, among the things of the past; and a systematic destruction of sea-bird life has become so completely the abnormal state of things that it is felt that, unless steps be immediately taken to protect them from harm—and, if possible, secure them from molestation — during the incubating period, by some stringent legislative enactment, there will soon be no birds left on the English coast.

It was recently stated in the leading journal that one person alone had a contract for 10,000 birds, the wings being largely used as an article of commerce; it seems, however, to be quite overlooked—or, if foreseen, to be a matter of indifference—that, even in an economical point of view, the supply must soon be followed by scarcity, with no source left to which to look for its possible renewal.

There are other grounds, however, of more imperial interest than the mere decoration of female attire, upon which an appeal may and must now be made on behalf of the sea-birds of Old England. It is understood to have been already proved before the Manx authorities, in procuring a special Act for the Isle of Man, that the cry of the birds in foggy weather will more effectually warn the seaman of his danger as he approaches the rock-bound coast, than either the fog-bell or the beacon-light could do; while the fisherman, earning his honest livelihood among the finny tribes of the deep, is often guided where to cast his nets, or where to drop his line, by the hovering of the sea-birds over the thickest of the shoal.

Other arguments might be adduced why these birds should have the fostering care of our country's laws, instead of being left to what must otherwise be their speedy and cruel fate; a plea might be put in in favour of that which constitutes, to every lover of the beautiful, one of the charms of the wildest parts of our coast scenery; but it is hoped that enough has been said to warrant the publication of this address, inviting co-operation and support for an association, the object of which is to endeavour to carry an Act through Parliament, in the ensuing session, for the purpose of preventing the destruction of sea-birds during the breeding season.

The following facts and figures were communicated by Commander H. H. Knocker, R.N., to *Land and Water*, and will show the necessity for prompt action. It takes only "the Yorkshire coast-line between Scarborough and Bridlington, a distance of about 18 miles, and which includes Filey, Speeton, Bempton, and Flamborough, North and South. The lowest estimate of numbers has been taken, that there may be no charge of exaggeration."

Time which the birds are on the coast (say from the middle of April to the 10th of August), 110 days. Say 25 boats daily (Scarborough, Filey, Flamborough, Bridlington), with 2 guns in each boat (many take 4 or 6), will make 50 guns; then 15 guns on shore (Mr. Dobson, gunmaker, has let out himself as many as 24 per day) gives a total of 65 guns. Allowing 15 birds to be shot or wounded per gun, this will give 975 birds per day, or 107,250 for the season. Add to this number 12,000 birds per season destroyed by professional bird-killers, and we have a total of 119,250 birds killed for pleasure and gain. Take also into calculation the egg-collectors, and compute them at 8, each of which would collect 100 eggs per day for 42 days, and we have a total of 33,600 eggs taken annually.

Allowing that two-thirds of the birds shot have young ones or eggs, this gives 79,500 young birds or eggs lost by their parents being destroyed. This does not include the numerous ones lost when the birds are frightened off the rocks, and sweep off the young or eggs they are sitting on. We then have

107,250 birds destroyed by pleasure parties,
12,000 birds destroyed for gain,
33,600 eggs taken,
79,500 young birds starved to death or eggs lost.

232,350 birds and eggs shot, wounded, die, and taken in the breeding season, or between the middle of April and early in August.

Those who wish to join the association are requested to send their names and addresses to one or other of the honorary secretaries — viz., the Rev. H. F. Barnes, the Vicarage, Bridlington; and Mr. Harland, Bridlington, Yorkshire.

A subscription of five shillings or upwards constitutes membership.

THE PAST YEAR, 1868.

AS one of the objects of SCIENCE-GOSSIP is to record the variations which each year presents, a few observations on the past season, in addition to those which have been already recorded, may not be out of place.

In the spring of last year I referred to the variegated leaves which had even then become noticeable from their frequent occurrence; and I may remark, in passing, that the variegated elder, which I then mentioned, had its later leaves of the usual colour, although the earlier ones were green

and yellow until the end of the season. As the year went on, these variegated leaves became more remarkable; so much so that, were I to give a list of all that I have observed, I should enumerate nearly a hundred species. Perhaps the most ornamental was a plant of the Ribwort Plantain (*Plantago lanceolata*) which I found near Knutsford: each leaf had a broad *white*—not yellow—border, throwing up the green centre with great effect. At Llanfairfechan, North Wales, I found a plant of Silverweed (*Potentilla anserina*) with the leaflets half yellow and half green. Doubtless many readers will call to mind additional examples.

Again, the general drought which prevailed in the summer months produced a curious effect upon the autumn vegetation. We shall notice, almost every season, that a few odd plants of certain species will put forth a second crop of blossoms in the autumn; but I have never observed this second crop so general as it was last year. While in Cheshire, at the end of September, I noticed that the Meadow Crowfoot (*Ranunculus acris*) was everywhere coming into flower; and on my return to Wycombe the same occurrence was equally conspicuous. The Dogwood (*Cornus sanguinea*) flowered twice; how many times the honeysuckle blossomed I am quite unable to say; certainly three, probably four. The Marsh Marigold (*Caltha palustris*) and Wood Stitchwort (*Stellaria nemorum*) were in flower at Mobberley at the end of September; the Garlic Mustard (*Alliaria officinalis*) blossomed again, in October, at Wycombe; and a turnip-field near Great Marlow was in the middle of November almost filled with *Erysimum cheiranthoïdes* and Penny Cress (*Thlaspi arvense*), just coming into bloom. These, and many other instances, suggest that a complete second crop was produced, the first having seed sufficiently early to allow of such an occurrence.

As to monstrosities and malformations, they have been unusually abundant; but an abler hand than mine has undertaken to describe them.

Many aquatic plants, deprived of what would seem their natural element, have, contrary to what might have been expected, flourished most luxuriantly. I first noticed this near Aylesbury in July, where the Arrowhead (*Sagittaria sagittifolia*) was growing in large masses in the almost dried-up bed of a stream. Water-lilies (*Nymphæa alba* and *Nuphar lutea*) were similarly benefited by this change of circumstance. Mr. Holland states that *Utricularia minor*, growing in pools containing but little water, was flowering freely at Oakmere; this species seldom blossoms in ordinary seasons. The Pillwort (*Pilularia globulifera*), in the same locality, formed masses, green and luxuriant as grass, many yards in extent. Many bog plants, however, had been seriously affected; on Lindow Common, Cheshire, the Sundews (*Drosera rotundifolia* and *D. anglica*), except in a few places, did not put in an appearance; *Andromeda polifolia* flowered three, if not four, times.*

On the road between Mobberley and Knutsford are three or four beech-trees; these had, apparently, been killed by the heat; their leaves were in august shrivelled and brown. At the end of September, however, after the showery weather, I observed young green leaves appearing at the ends of several of the branches.

Mr. Holland has referred (SCIENCE-GOSSIP iii., p. 249) to the growth of fresh shoots from the axils of the leaves on the dead main stem of many plants. Here, at High Wycombe, the same thing has been noticeable.

In the *Field* of September 19th a correspondent says that there were two regular swarms of bees on September 1st in a garden in the parish of Shiplake, Henley-on-Thames. The editor thinks that these were cases of desertion of the hive for want of food, and that the correspondent was mistaken. It seems, however, quite likely that the *bees* were mistaken in the season, and did swarm, as many plants had put on an appearance of spring. In fact, the bees probably did not swarm *before*, because of the scarcity of food; but they did then, because there was a new supply. Bees do not generally desert a hive *en masse*, but dwindle away, usually leaving a considerable number of dead ones behind.

Other entomological occurrences—such as the great number of "whites" recorded from many places, the absence of wasps, the appearance of rare moths and butterflies—I leave to be recorded in detail by those who devote themselves to their observation.

B.

POPPY-SEEDS.

IN continuation of the theme of "Microscopic Seeds," commenced in our November number, we offer figures and descriptions of a few seeds from the Poppy family, known to botanists as the *Papaveraceæ*. There is undoubtedly a great similarity in the seeds of the true Poppies themselves, or at least in all we have had the opportunity of examining, but the different genera of the order present peculiar types, which will be seen to differ entirely from those of the Foxglove family (*Scrophulariaceæ*) already described.

The OPIUM POPPY (*Papaver somniferum*) has two varieties of seeds, the one called "white-seeded," with pale buff-coloured seeds, and the other "grey-seeded," with pale slate-coloured seeds. Microscopically, there is no difference, save in the colour. The form is kidney-shaped, and the surface reticulated, so as to leave shallow hexagonal pits, which

* See SCIENCE-GOSSIP iii., p. 162.

again are more minutely reticulated with faint hexagonal veins, more distinct in the grey than in the white variety (fig. 6).

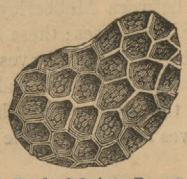


Fig. 6. Seed of Opium Poppy, × 40.

The LARGE-FLOWERED ARGEMONE (*Argemone grandiflora*) is a cultivated plant. The seeds are larger than in the Poppy, of a brownish-black colour, nearly egg-shaped, pointed at one end, and reticulated in a similar manner, but the pits are deeper, and more distinctly concave. The secondary reticulations are almost obsolete (fig. 7).

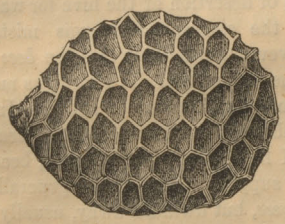


Fig. 7. Seed of *Argemone grandiflora*, × 40.

CALIFORNIAN PLATYSTEMON (*Platystemon Californicum*) is another cultivated plant. The seeds are very distinct from those of the Poppies, being brownish-black and shining, elliptical, with a longitudinal furrow on one side. The reticulations are very faint, irregular, and elongated (fig. 8).



Fig. 8. Seed of *Platystemon Californicum*, × 40.

COMMON ESCHSCHOLTZIA (*Eschscholtzia Californica*), found in nearly every garden, has rather large ovate seeds, bluntly pointed at each extremity. They are of a dull grey colour, deeply and coarsely reticulated. A distinct furrow usually traverses the seed longitudinally. The depressions are irregularly hexagonal, the ridges irregular at the margin, and striate from the base upwards. Secondary, small, faint, hexagonal reticulations are just visible at the bottom of the pits (fig. 9).

SLENDER-LEAVED ESCHSCHOLTZIA (*Eschscholtzia tenuifolia*).—The figure of this seed, furnished by Mr. E. Marks, is so distinct in its character from

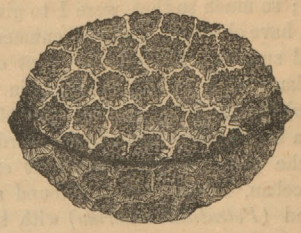


Fig. 9. Seed of *Eschscholtzia Californica*, × 40.

the foregoing that one feels almost disposed to doubt its identity. The form is irregular, almost spheroidal, and the surface, instead of being reticulated, is covered with large, prominent, conical



Fig. 10. Seed of *Eschscholtzia tenuifolia*, × 40.

projections (fig. 10). If truly an *Eschscholtzia*, and we have no other reason to doubt, it serves as a caution, not only against hasty generalizations, but also against the supposition that the seeds of all allied plants are very much alike.

THE RUDD AND ITS SCALES.

THE Rudd, or "Roud," as it is locally called, is a common fish in the Norfolk Broads, and in the rivers which run through them. Zoologists recognize it as a distinct species under the name of *Cyprinus erythrophthalmus*. Anglers know it well in those waters, not only when they see it, but before they see it, by the manner in which it takes their bait. No angler who has been accustomed to this fish would ever dream of regarding it as only a local variety of some other fish, as the roach, or as a hybrid. Yet some persons have of late given expression to a doubt whether the Rudd is not a hybrid between the Roach and the Bream. The supposition is ingenious, but, as I believe, utterly groundless. The habits and personal appearance of the fish condemn such a hypothesis. When cooked, its flesh is much firmer than either of the others of which it is *supposed* to be the offspring. At any rate, it is a truly fertile hybrid, and in the brightness of its colouring, and its edible qualities, is far superior to either of its *supposed* progenitors. The forms of scales in the three species are here figured for comparison, and we doubt whether they

can be adduced as any evidence of hybridization. Lubbock, in his "Fauna of Norfolk," says that, although often in company with the roach, "the Rudd, on the whole, prefers the broad, and the roach the river; is very lively and active, rises freely at flies, and is fond of sporting on the surface; is most

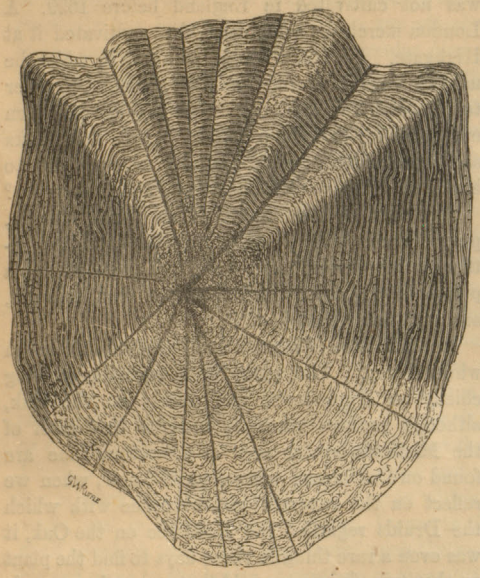


Fig. 11. Scale of Rudd, × 10 diameters.

vivid in colour, sometimes nearly rivalling the gold fish; does not often exceed two pounds, but is commonly met with a pound and a half in

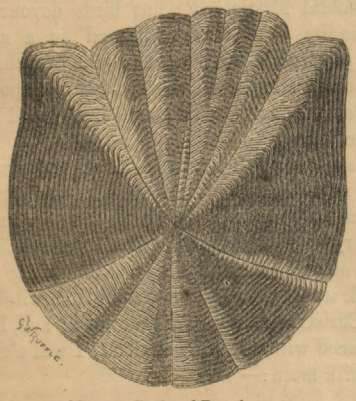


Fig. 12. Scale of Roach, × 10.

weight; is much better to eat than the roach or bream. I have seen marshmen select Rudd for their own cookery, whilst they carried bream and roach home only for the dogs or the pig." To these observations we can bear evidence, founded upon many and many a day's pleasant sport amongst them, and sundry breakfasts at which a dish of Rudd was smoking. Although so plentiful in Norfolk, this is undoubtedly a local fish, and in many parts of the British Isles is wholly unknown. It has, however, been recorded from other localities than those in which we have made its acquaintance, as Yorkshire,

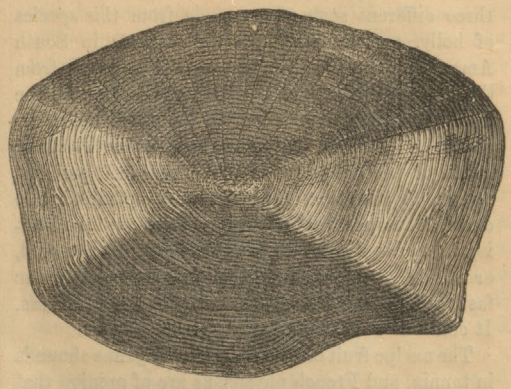


Fig. 13. Scale of Bream, × 10.

Lincolnshire, and Oxfordshire, to which I believe Cambridgeshire may be added. The scales figured are from fish taken last August, on the same day, and within a few yards of each other, in the neighbourhood of Barton Broad. C.

CHRISTMAS BERRIES.

Heap on more wood! the wind is chill;
But let it whistle as it will,
We'll keep our Christmas merry still!

CHRISTMAS Berries. What are they? what do they include? Looking back to former days, and many a right merry Christmas long gone by, I should certainly say that the holly, the laurel, the ivy, and the mistletoe are most undoubtedly Christmas berries, for the plants and shrubs on which they grow have been, and still are, those most generally used for the decorations in fashion at Christmas-time in private houses. Church decorations is another matter. Many persons object to the

Ivy soft and meek of speech,

as the old carol has it, because it was considered sacred to Bacchus; and as to the mistletoe, a lady of my acquaintance read some young relatives of hers a long lecture on the Druidical rites performed in connection with this parasitical shrub, when they faintly hinted that its smooth white berries would form a pretty contrast to the coral-like red of the holly fruit, in an elaborate piece of floral embroidery, which they were making for a pet curate's especial delectation. But, as I am not particularly up either in clerical millinery or church ornamentation, I shall confine my description to those old home favourites, which we doubtless all remember as associated with our earliest recollections of Christmas day.

Nay, ivy, nay, it shall not be I wys;
Let holly have the mastery, as the manner is.

Our holly is the *Ilex aquifolium*, a tree possessed of many valuable properties, but far inferior, nevertheless, to its South American cousin, the Matê, the native tea-tree, I may call it, of the country. There are three different sorts of tea made from this species of holly, and brought into the markets in South America: one called the Caa-cuys is prepared from the half-opened leaf-buds, roasted and powdered; the other, Caa-mire, is the leaf in its green state, deprived of its midrif and veins; whilst the Yerva de Palos of the Spaniards is the entire leaf, petioles, and small branches dried and beat up into a fine dust. A teaspoonful will make a large cupful. Boiling water is poured on it, and it is drunk when cold, or I should say sucked through a tube, after the fashion in which the Yankees imbibe cold drinks. It contains the same principle as tea—*theine*.

The unripe fruit of some of the holly genus abounds in tannin, and French physicians are of opinion that the Ilicine (medicinal principle) is a most efficient substitute for Cinchona bark.

There is little doubt but what the dressing up of houses at Christmas-time was derived from a heathen custom, for we read that the Romans ornamented their dwellings with green boughs during the Saturnalia; but I do not see why this should afford any just cause of objection to our introducing evergreens into our houses, for, if there is a Pagan precedent, there is also a Biblical sanction. The Jews employed evergreens in their Feast of Tabernacles, and Christ entered Jerusalem over strewn Palm branches.

Have you ever heard it said that if the evergreens put up at Christmas-time are not taken down before Candlemas-day, there will be a death in the family who occupy that house before the year is out?

Ivy-berries are smooth and black; they hang on all the winter, unless picked off by the birds. Wood-pigeons, especially, are devoted to them; and I have heard it said that the resin which exudes from old branches will attract fish. If this be true, then fish do smell, which some writers in *Land and Water* appear to doubt, and have lately been discussing with considerable facetiousness. By the way, it is as well to observe that the Irish Ivy, which is considered by some to be a variety of the common, bears *red* berries.

Ivy formed the poet's crown in days gone by. Horace in his ode to Mecænas, and Virgil in his seventh Eclogue, both refer to this custom. Indeed, the plant appears to have been a very great favourite with all the poets—so many of our own writers, ancient and modern, abound in beautiful allusions to it. The wood of the Ivy being so soft and porous, it obtained the reputation of being able to separate water from wine when the two were mixed together. Pliny mentions this, and gravely says that the water filtered through its pores, leaving the wine in the vessel.

Garlands of Ivy are decidedly very pretty, and the ancients displayed good taste when they decorated the statues of their gods with it. There are over fifty species of Ivy.

The Laurel was first brought over to Constantinople from the Caucasus by the name of *Trabison cumasi*, or "date of Trebizond," in 1576; but it was not cultivated in England before 1629. A London merchant, a Mr. Cole, first cultivated it at Highgate. He had a single plant of it, which he used to cover in winter time with a blanket in order to protect it from the frost. Who that has ever seen our beautiful evergreen Laurel hedges and banks at Christmas-time could possibly imagine this to have been the case with their first English ancestor?

The fruit of the Laurel is an ovate, shining, purple-black berry; and, singular to relate, although the leaves, inner bark, and seeds contain a poisonous principle, the pulp of the fruit does not, and a preserve is made of it.

The Mistletoe (*Viscum album*) produces a smooth white berry. The plant is a parasite, growing chiefly on Apple-trees, and rarely on the Oak, although persons generally imagine that most of the Mistletoe-berries seen at Christmas-time are found on Oak-trees; but we must know, when we reflect on the superstitious reverence with which the Druids regarded the Mistletoe on the Oak, it was even a rare thing in those days to find the plant on that tree, for we are told that a *search* was made for it even in an age when this island was covered with forests of Oak.

The berries were certainly, in the days of Shakespeare, considered poisonous, for he writes of it as the "baleful Mistletoe"; but birds devour them very readily, and it is mentioned in a natural history of Prussia, by Boek, that the branches and leaves of Mistletoe had been dried and pounded in times of scarcity, and made into bread mixed with rye-flour.

There are some singular old superstitions connected with this plant, originating, doubtless, in the Druidical customs before alluded to; and the peasantry in some parts of England even now believe that an amulet made of the wood and hung round the neck would preserve the wearer from witchcraft.

My Christmas berries are described; and, having commenced with a line from Scott, I will e'en conclude with more:—

> And well our Christian sires of old
> Loved when the year its course had rolled,
> And brought blithe Christmas back again
> With all his hospitable train.
> Domestic and religious rite
> Gave honour to the holy night;
> On Christmas-eve the bells were rung;
> On Christmas-eve the mass was sung;
> That only night, in all the year,
> Saw the stoled priest the chalice rear.
> The damsel donned her kirtle sheen;
> The hall was dressed with holly green;
> Forth to the wood did merry-men go,
> To gather in the mistletoe.

HELEN E. WATNEY.

APHIS LION AND LACEWING FLY.

IN the latter end of August last year my attention was attracted to an ivy-leaf, in the centre of which was something white. I gathered it, and on nearer inspection found that there were about twenty or twenty-five small white bodies elevated on an exceedingly fine footstalk, which again was attached to the centre of a small glistening circular disc on the upper surface of the leaf. Each was about the third of an inch long, and the space they covered did not exceed the size of a fourpenny piece. I had never seen anything of the kind before, and, fearing lest I should not meet with it again, I took all the care possible of it, and immersed the end of the leafstalk in water. It put me more in mind of the fructification of some of the new mosses than anything else, and I imagined it was a minute fungus. I looked at it from day to day, but it remained just the same, even after the ivy-leaf dried up and became brown. It did not seem to suffer from the loss of moisture, but each little oval body stood up as stiff and erect as ever on its tiny footstalk. For ten days or a fortnight there was no change at all, and then I had to go away; fortunately, I returned just as the mystery was being solved. Coming in within a week, and in the middle of the day, I went to the shelf on which they stood, and there, upon the marble and close to the bottle, I saw two or three little black bodies crawling along. There were some on the bottle, more on the old brown leaf, two were leisurely descending the stalks from their elevated cradles, and one was just emerging from its shell. I was just in time to see the little colony burst into life; had I been a day later I should have felt satisfied it was a vegetable organism, as when the eggs were open, the regularity of their toothed margins tended to favour that idea. I had very little time to spare, but popped a few into a pill-box; and as the microscope stood on the table ready to hand, I put one into the live-box, so as to get some means of identifying it subsequently; I found it covered with black hairs, and the possessor of an enormous pair of jaws. As I hurried away again, I wondered what it was, when it occurred to me that such a singular egg as this could never have escaped the notice of Kirby and Spence. On turning to that work, I was enabled to identify it as containing a larva called the Aphis Lion. Not very long before, out in the garden one evening with the same object which led me to discover these eggs, just as it was getting dusk, I noticed some fairy-like insect flitting about, and scarcely visible. I made several ineffectual attempts to catch one; and when at last I succeeded in getting my hat over one on the grass, and cautiously raised it, I was not clever enough to prevent its getting away. At length I saw one fairly settle on the palings, and having a small box in my hand, I took off the lid and inverted the box over the creature, then dived into my pocket for an envelope, which I slipped underneath the box, and then gradually withdrew it as I put on the lid. I conveyed it indoors, and examined it beneath a gas-lamp, and I found an insect with a beautiful green body, large brilliant eyes like polished copper, and two pairs of large membranous wings, pale green, and reflecting the prismatic colours. Its wings were folded together; and as I took hold of them to remove it from the box, I became conscious of a most disagreeable smell; so that I popped it at once under a wineglass, and put in also a bit of paper steeped in chloroform. The smell is so pungent that you can taste it in your mouth as soon as you can smell it; what to compare it to I do not know, but it reminded me of sulphurous acid. Bad as it was, I was rather gratified by it than otherwise, for I thought so beautiful a creature with so foul an odour was sure to be in Kirby and Spence's book, and there I found it, under the name *Chrysopa perla*. Wonderful as it is for its beautiful colour, for the brilliancy of its eyes, for the lustre and delicate structure of the wings, and also for the villainous nastiness of its perfume, it is no less wonderful as producing the singular eggs which I have before described: the Aphis Lion is the larva of the *Chrysopa perla*. They spin themselves a silken shroud, that they may die to the winter, from which they rise as the perfect insect in the following summer. It is curious that an insect so gorgeously got up should fly only in the twilight, when its beauties cannot be appreciated; perhaps, however, there are eyes which can see more than ours; but if there are, I am afraid the owners, instead of admiring it as a beautiful object, would admire it more as an article of diet; and doubtless for that reason it is supplied with the means of emitting an odour which would deter any created being, I should imagine, from entertaining such a thought for a moment. If any of the egg clusters are found, it would be quite worth while to transfer them to a conservatory, especially if infested with aphides, as these form the principal food of the larva in question. As soon as hatched, they start off in their search of the insects, and are said to require only half a minute to suck all the juice out of the biggest aphis. They are very voracious, only ceasing to eat when the supply fails, and then they not unfrequently attack each other. When gardening becomes more scientific, and it is considered necessary to have some little knowledge of the insects that are beneficial as well as prejudicial to plants, the eggs of the *Chrysopa perla* will doubtless possess some market value, and will be carefully collected for the express purpose of placing in greenhouses; and then the progeny of a dozen of the insects will perhaps be found to rid a house of aphides more effectually and more economically than all the tobacco-paper that has ever been smoked.—*F. H. Ward.*

ZOOLOGY.

SPHINX CONVOLVULI.—The following paragraph has been going the round of the papers:—"A lady informs the *Leamington Chronicle* that she has recently seen *the* humming-bird (!) in Staffordshire, Cheshire, and Warwickshire. The plumage was of a reddish brown, speckled upon the back with white." Is it not possible that *S. convolvuli* was intended? This rare moth has been taken this year at High Wycombe and at Great Marlow. In the latter neighbourhood several specimens of the pale Clouded Yellow (*Colias hyale*) have been captured this season. *C. edusa* has this season occurred in the north and south of Buckinghamshire, and seems to be gradually becoming more frequent in the country.—*B.*

THE CUCKOO.—A correspondent of SCIENCE-GOSSIP asks for information concerning the cuckoo, and perhaps the following facts, mostly gathered from Montague's "Dictionary of British Birds" (see Introduction), may be interesting. The cuckoo generally arrives about the first or second week of April, but it has been heard on the 27th of March, as already mentioned in SCIENCE-GOSSIP; but it may be mentioned that one must be careful not to be taken in by some small boy who endeavours to April-fool his friends by imitating the notes so easily copied. Montague observes that the cuckoo has probably the power of retaining its eggs in the ovarium, and the reasons for supposing so are the following:—It would be often necessary, on account of the difficulty of always finding a nest ready for the cuckoo's egg, as it is highly improbable, if an egg were laid in an unfinished nest, that a small bird would continue incubating; yet it has been frequently observed that in cases where the cuckoo's egg has been dropped the last into the nest it has been the first to hatch. This causes a supposition that the egg may have been retained in the ovarium, and therefore is already partly incubated by the internal heat of the cuckoo's body. But, at the same time, that the cuckoo is unable to retain the egg beyond a certain time is evident from the account given by Mr. Harper, of Norwich, who shot a cuckoo with its egg in its beak searching on the ground for a nest to deposit it in. This bird had another egg in the ovarium of the same size, but without the calcareous covering. This also proves a question which has been much mooted—namely, that the cuckoo does not "lay" her eggs, but deposits them with her beak, and the nest has so often been found in positions where the egg could not have been laid, that it seems that there is no doubt about the fact. The nests chosen appear to be of many kinds—amongst others, the hedge-sparrow's, redbreast's, pied wagtail's, linnet's, redstark's, titlark's, meadow pipits, and reed bunting's are mentioned. It has been stated that when the young cuckoo's foster-parents are unable to feed it sufficiently, they call all their neighbours to help them; but it is much more probable that they mistake it for a hawk, and assemble round it as swallows and other small birds do round rapacious birds. That the young cuckoo throws other young birds out of the nest after being a day or two old is undoubted; but is it not possible that the old cuckoo may assist at first, as it has been stated that a young cuckoo is too weak for some days to stand up, much less to throw out other birds? Young cuckoos have not been as yet successfully reared: the one kept longest died, not inappropriately, on the 1st of April. Should I have made any mistakes, I only hope any other correspondent will kindly correct me, as I shall be glad of all communications on the subject; and if any abler person will enter further into the subject, he will oblige many who with myself take much interest in the history of the cuckoo.—*E. G. W.*

GNATS.—About thirty years ago I remember an extraordinary flight of gnats; it consisted of a column about a foot in diameter, which rose nearly perpendicularly to the height of about fifty feet; it waved about in the wind, lost its perpendicularity, and was finally dispersed by the wind. The column itself was at first tolerably compact, and contained probably a quarter of a million of insects. A more extraordinary flight occurred at Nottingham, on the 4th of October, 1858; I say more extraordinary, inasmuch as I have heard and read of single columns of gnats, like that just mentioned, but I have never seen or heard before or since of a flight similar to that I am about to describe. It was between four and five o'clock, as I was crossing the little river Leen, below the castle rock on the western side, that I noticed a series of perpendicular lines extending for nearly a mile over the gardens along the bank of the stream, giving to the clouds and the smoke of a tall chimney in the distance a most extraordinary appearance. On a nearer inspection I found these lines to be columns of gnats. The base of each column was about six feet from the ground, and extended upward to the height of from twenty to one hundred feet; the columns were all cigar shaped, that is, tapering at each end, and having a diameter in the centre of about eighteen inches. The columns appeared to be distant from each other about thirty or forty feet, and extended over a space about thirty or forty yards in width, by nearly a mile in length. On standing beneath one of the columns, the gnats were seen to be in rapid motion, and performing the most complicated gyrations, but constantly preserving the peculiar cigar-shape, and not altering the position of the columns, which appeared to be stationary. How long they remained in that position I am unable to

say; I watched them for more than half an hour, and as I returned home could see them distinctly half a mile distant. On a rough calculation I suppose there would be about ten millions of insects. I have never read of a similar flight, and, not having seen any notice of the above, I thought that the fact ought to be recorded.—*H. O. S.*

GLOSSY IBIS IN NORFOLK.—A fine specimen of the now rare visitor to the Norfolk coast, the Glossy Ibis (*Ibis falcinellus*), was shot near Stalham last month.—*E. A., Norwich.*

THE SMEW (*Mergus albellus*).—A beautiful specimen of this bird was shot by the late Robert Hawking, Esq. It was disporting on the river Ouse, eleven miles above York. The figure (44) in SCIENCE-GOSSIP gives a very correct idea of the bird, and is very life-like. The bird was preserved, and is now in the possession of W. D. Hawking, Esq., of Laiton.—*Jno. Ranson, Linton-on-Ouse, York.*

MAIGRE AT BRIGHTON (*Sciæna aquila.*)—On Sunday morning, November 22nd, as a labouring man was strolling along the beach in front of the Marine Parade, his attention was attracted to a large fish which was floundering about in shallow water, where, doubtless, it had been driven by the high gale and rough sea of the previous night. With the assistance of some other loungers, he secured the prize, which excited the admiration of all who saw it by the splendour of its colour. Its scales, which were of a large size, shone and flashed in the light like burnished gold. The fins, which were large and extended, were of a deep crimson colour. In shape it was like a salmon, with small head, of elegant shape, and above five feet long. In weight it was about 70lb. It proved to be a very rare fish, the "Maigre," of the Mediterranean, and *Peis rei* or Royal Fish of Rome, only four specimens of which (including the present one) have been known to be caught in the British seas. The fish was still alive when brought to Mr. Wright's, on whose slab it was exposed during the whole of Monday, and attracted admiring crowds, the colours continuing very brilliant to the last, though, of course, less so than when the fish was first caught. The "Maigre" is much esteemed at Rome as a delicacy of the table, and we can speak from experience on the point, being indebted to R. Peak, Esq., who became a purchaser of the fish, for an opportunity of tasting this visitor from the south.—*Brighton Herald*, Nov. 28.

TERN AT SYDENHAM.—I lately noticed a Tern or Sea-swallow skimming over one of the ornamental waters in the grounds of the Crystal Palace.—*W. R. Tate, Grove Place, Denmark Hill.*

LEGAL ZOOLOGY.—The following cutting is from the police report in the *Times* of December 9th:—"A gentleman applied to Mr. Vaughan to ascertain if there were any means of punishing a street hawker of birds under the Act for the Prevention of Cruelty to Animals, or any other Act. Having noticed that the bird-vendor in question was in the habit of illustrating the tameness of his canaries, &c., by exhibiting them openly on his hand, without any apprehension of their flying away, the applicant had the curiosity to purchase one. He then discovered that the pinions under the wing had been snapped asunder and completely drawn away, so that the birds were unable to fly at all. It was obvious that this process of 'taming' the birds was attended with great cruelty, and the man, who lived in Shoreditch and constantly visited the Strand, ought, if possible, to be summoned. Mr. Vaughan, after consulting the statutes, said that a bird was not an animal within the meaning of the Act for the Prevention of Cruelty to Animals, even if the specific act of cruelty alleged in this case could be proved. The applicant remarked that it is illegal to encourage cock-fighting. Mr. Vaughan said that there was a special enactment with regard to cock-fighting, but it did not apply to an offence of this kind." Another illustration of the familiar saying about driving a stage-coach through an Act of Parliament. A man might with impunity roast an Ostrich alive under the very nose of authority.—*W. Cole, Clapton.*

WOOLWICH MOSQUITOES.—At the Entomological Society of November 2nd, "the Secretary exhibited a specimen of the so-called Mosquitoes sent from Woolwich, which proved to be a species of *Chrysopa*." Hence it will be evident that two or three different insects have been confounded together under the one name of "Mosquitoes" in that locality, and none of them the genuine article.

CLOUDED YELLOWS.—I can assure your correspondent "H. H. O'Farrell" that the Clouded Yellow Butterfly (*Colias edusa*) is not uncommon near London in certain seasons: I have taken it at Tooting, Wandsworth Common, Dulwich, and Forest Hill. It has been taken plentifully in clover fields near Bromley, Kent. The pale-clouded yellow butterfly (*Colias hyale*) has been taken occasionally at Forest Hill.—*C. Wood.*

THE PILL MILLEPEDE, or wood-louse, as it is here called, comes into my house in the autumn, and is a perfect pest. They congregate on the walls, and run on the floor under the carpets, and on the carpets, so that we can hardly take a step in the room without crushing them. Finally, as the weather grows colder they all disappear, hiding behind the skirting board and under the floors, to emerge again when the temperature rises in March and April. Can you or any of your readers suggest a method by which they may be got rid of?—*W. B. C.*

[Consult the Notes and Queries in prior volumes of this journal.]

MICROSCOPY.

SECTIONS OF FOSSIL WOOD.—Having been asked by several readers of SCIENCE-GOSSIP how I cut and grind my sections of fossil wood, &c., I will, with your permission, give my method. First, I will begin with the cutting. To the framework of an ordinary foot-lathe I attach an upright spindle (see the accompanying sketch); on this upright spindle I drive, by a band passing over carry pulleys from the wheel below. On the top of this spindle I fix my cutting disc, which is made from a very thin piece of sheet iron, and is about six inches in diameter; the edge of this saw I charge with diamond powder; to the edge of the saw I hold my specimen, and as it cuts I lubricate the edge with a small brush dipped in turpentine. With this method I have cut sections of fossil wood so thin that all its structure has been well defined and required

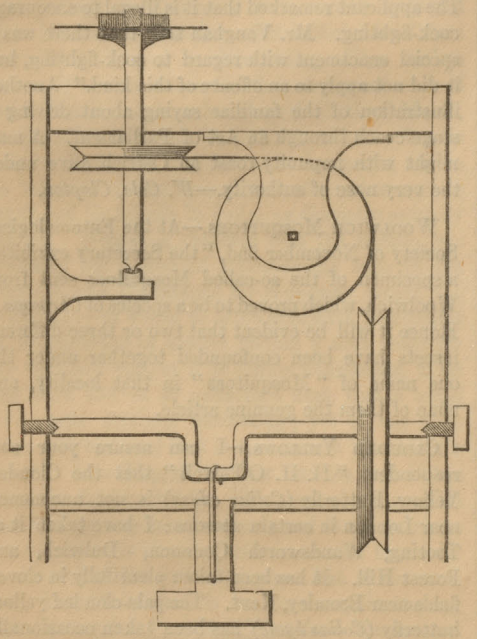


Fig. 14. Section Cutter.

nothing but mounting in balsam: this has been silicated fossil wood; in cutting calcareous fossil wood, I have to cut the sections thicker, and grind them down. My grinding apparatus is composed of leaden laps, which I make to revolve in a horizontal position on the same upright spindle on which I fix my cutting saw; I use two laps, one for rough grinding, and the other for smoothing. I use No. 1 emery and a little water with the first lap, and flour of emery with plenty of water on the second lap. In preparing a specimen, I first grind a smooth surface on one side, and then fix it to a plate of glass (of such a size as will suit my specimen) with Canada balsam; I then reduce it in thickness on the rough lap, till I begin to see the light through it; then I begin with the smoothing lap, and reduce it with flour of emery until every part of its structure is distinct. If I choose to polish the specimen, I do so on a lap made of plush cloth, or cotton velvet, and putty powder; I then float them off the slide on which they have been ground, and fix them on another with Canada balsam. I prefer, were it practicable, to mount them in balsam under a thin cover in the usual way, as I am satisfied that the structure is better brought out. If any of the readers of the GOSSIP are similarly engaged, I shall be glad to correspond with them on this subject.—*John Butterworth, Mount Pleasant, High Crompton, near Oldham.*

SUBSTITUTE FOR NOSE-PIECES.—Will you allow me to lay before the microscopical portion of your readers a suggestion for the more ready attaching and detaching of object-glasses? I take it for granted that all who work much with the instrument have found inconvenience in changing the powers rapidly, particularly when examining objects with which they are unacquainted. Nose-pieces (especially when made to hold more than two powers) are inconvenient, heavy, and costly, and are much in the way. My plan is as follows—

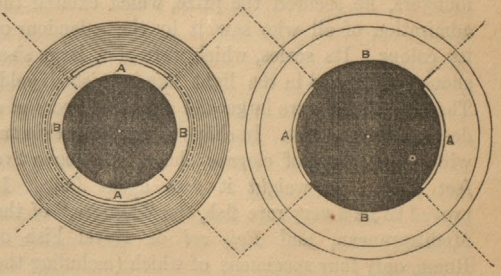


Fig. 15.

Upper end of Object-glass. *a*. Thread untouched.

Lower end of Object-glass. *b*. Thread removed.

viz., Divide the circumference of the screw, both of the "object-glass" and "body," into four equal parts; then file away all the thread in two opposite quarters, leaving the remaining two opposite quarters intact (it is better in practice to remove slightly more than one-fourth on each side, so as to allow free clearance. The object-glass may now, by placing it so that the remaining portions of thread come opposite the corresponding gaps, be passed into the body, right up to the shoulder, *without turning it round at all;* and about one-eighth of a turn fixes it in its place as firmly as if screwed in. The adoption of this plan does not prevent the use of the altered object-glasses with other instruments, nor does it preclude the use of unaltered object-glasses with altered bodies.—*James Vogan.*

MICROSCOPIC COLLECTING-CASE. — A new description of collecting-case for professional or amateur microscopists, made by Mr. Stanley, of London Bridge, was exhibited at the Quekett Microscopic Society's meeting on the 27th of November last, by Mr. Farmer, and met with general attention and approbation. The description of this article, of which an illustration is given below, will no doubt be interesting to many. In outward form it much resembles a rather large japanned tin sandwich-box, being similarly constructed to fold in two equal parts, the only outward addition being a leather strap, omitted generally from sandwich-boxes, which enables it to be carried suspended from the neck, to rest under the arm or upon the loins, to the taste of the wearer. So far as concerns the exterior, it appears light, rather professional-looking, and not inelegant. As regards the practical part, the interior consists of several divisions, or compartments,

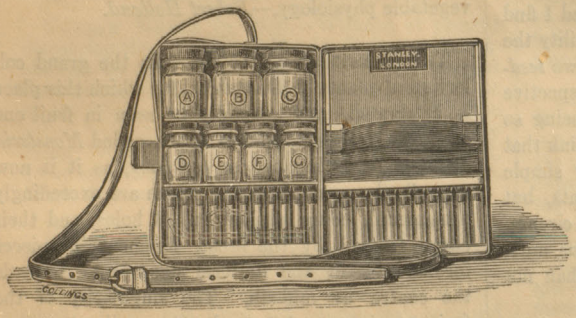


Fig. 16. Collecting Case.

which are fitted with the simple useful collecting-apparatus to be described. The first, or upper compartment, contains three wide-mouthed bottles, each capable of holding three fluid ounces: these are lettered *a*, *b*, *c*, respectively, and are each fitted with a varnished cork. The second compartment contains four similar bottles of a smaller size, and lettered respectively *d*, *e*, *f*, *g*. In the third, or lower compartment, a kind of brass clip is secured by an india-rubber band; this clip, when detached, will hold the neck of either of the bottles described; it has also a screw connected to it, by which it may be fixed on the end of a walking-stick or other rod that may be used as a dipping-rod; this compartment also contains a pair of forceps, a double hand-lens, four dipping-tubes, and a series of eleven parallel vials, fitted with corks, which are varnished and numbered respectively one to eleven. An opposite compartment to this contains a similar set of bottles numbered from twelve to twenty-two; this, with a sunk glass microscopic slide, and a piece of wash leather for cleaning or wiping, completes the whole arrangement. With the above apparatus it is presumed we should be equipped for a week's or longer journey, and should operate something after this manner. We arrive at, say a pond or ditch, which we think from position and other circumstances may contain choice diatomaceæ or other objects of our research; we secure bottle *a* to the brass clip, and screw it to our walking-stick or rod; thus secured, the bottle will dive for mud, water, or weed, which we continually examine by the aid of one of the dipping-tubes, microscopic slide and lens. If our objects are satisfactory, we reduce the bulk as much as possible by straining off or dipping, and examine and place the quantity we wish to save in one of the vials, commencing with No. 1; or, if very full of good things, we save a quantity in bottle *d*; or if we wish some special choice specimen, we isolate it in vial No. 2. At the end of our search in this spot we place in our note-book the locality and particular objects we have collected, as nearly as we know, with number of bottle or vial in which we have placed them, and plod on our journey. And thus with other spots and other objects, wet or dry, until we are satisfied with our results, sometimes filling only the seven bottles for evening examination, at other times selecting and discarding as time and inclination suggest.—*J. S.*

JANUARY.—This is not usually considered a good month for obtaining microscopical objects out of doors, but even now some of the common *Rotifers* and *Vorticellidæ* are to be obtained in quiet pools, and *Conochilus volvox* may be collected even when ice covers the surface of the water.

Fungi are also to be found belonging to several families. Dead leaves will furnish some, and dead twigs other, species of *Sphæria*, but in most instances their fruit will be in better condition in March. Of the *Myxogastres*, tufts of *Trichia* and *Stemonitis* should be sought on very rotten wood. Moulds of various species may be collected on decaying vegetable matter. The exuviæ of cats and dogs will furnish *Mucor caninus*, and on the former we have found at this season the rare *Isaria felina*, in white fleecy tufts. Insects are not very numerous, but the "cricket" will be found singing "on the hearth," if his gizzard is wanted, and the Water Beetle (*Dytiscus*) and Boat-fly (*Notonecta*) are still in their haunts. This is a good season for exploring under the bark of old trees and prostrate timber. Correspondents are invited to contribute notes of microscopical objects to be sought for in February and the ensuing months, so that we may continue this "looker-out" for objects of interest to the microscopist throughout the year. It may be followed, with advantage perhaps, in Botany, Entomology, &c., another year. Contributors are desired to be as brief as possible, and to include specially those objects which the succeeding month is expected to furnish in the greatest numbers or in greatest perfection.

BOTANY.

OXALIS ACETOSELLA.—The Wood Sorrel produces seed throughout the summer and autumn from a petalous flower, exactly after the fashion of the Sweet Violet; but I cannot find the fact noticed in any book. At the present time there may be found any quantity of seed-vessels in all stages of ripeness, yet no flowers have been seen since the early summer.—*Robert Holland.*

BUD-VARIATION.—I have now in my garden a very beautiful example of what Darwin calls bud-variation. A plant of Snapdragon, which grows with two main branches, produces on one of them crimson flowers with the orange tinge and orange blotch on the lower lip, so frequently seen; the other branch produces flowers of a pure crimson colour, having a white tube. At first I thought that two plants must have been planted close together; but I have traced the branches down below the soil, and I find they proceed from one root. In all probability the variety has resulted from a cross between two *seedling* varieties which had flowers of the respective colours; but from the fact of the plant being so distinctly forked from the base, I should think that the branches are not exactly *sporting* by simple reversion to the colours of the two parents, but that the seed had contained *two embryos*, a circumstance of not unfrequent occurrence in acorns, nuts, and chestnuts, and which we see oftener than not in mistletoe.—*Robert Holland.*

RANUNCULUS TRIPARTITUS, D.C.—("R. V. T.")—The specimen sent from Withiel, Bodmin, belongs to this species. Mr. Keys, in his "Flora of Devon and Cornwall," localizes it "near the Land's End," but names no other locality for it. In the "Compendium of the Cybele Britannica," the counties of Cornwall, Dorset, Hants, Kent, Surrey, and Pembroke are named for it. "R. V. T." remarks that at Withiel it was "found growing with *R. hederaceus:* in general appearance it differs from *R. hederaceus* wherever growing, but it very much resembles it in habit and situation."—*B.*

LAUREL-LEAVES.—I hoped to have seen in the last two numbers of SCIENCE-GOSSIP some further information respecting the peculiar markings at the back of the leaves of the Common Laurel, noticed by "H. W. W." in the August number, p. 191. There is no doubt that these marks exist; I have found them on *every* leaf that I have looked at, and I have examined a great many since I read your correspondent's remarks. They do not appear to me to be wounds caused by insects; for in the early stage they seem like mere depressions in the leaf, after which a round piece of thickened epidermis appears. I cannot detect the slightest wound, nor any minute larva under the skin. In this stage they look very like some natural peculiarity of structure in the leaf; but after a while they become pale brown in colour, and there is a mass of brown cells under the skin, causing a slight elevation of the surface. In this stage they have all the appearance of fungous growth. In old leaves there only remains a brown scar of hardened membrane. The marks always seem to occupy the same position on the leaf as described by "H. W. W." I have not been able to detect anything like them on any other leaves, except on those of the lilac, where I have found a few spots somewhat similar in their early stage, but which are evidently caused by the attacks of a fungus, the black spores of which can, at a later stage, be plainly seen bursting through the epidermis. But the spots on lilac-leaves are not by any means universal as on the laurel. It is to be hoped that the subject may be further investigated; for at present these marks, their nature, cause, and use, seem to be amongst the obscure points of vegetable physiology.—*Robert Holland.*

THE MONSTERIA DELICIOSA.—In the grand collection of plants at Dangstein, for which this place is celebrated, may generally be seen in fruit one of those strange species of Arads called *Monsteria deliciosa* (or *Philodendron pertusum*, as it is now named), the great leaves of which are exceedingly ornamental, being slashed full of holes, and their edges fringed by the broad ligament-like pieces formed out of the uniform deep cuts towards the centre or mid-rib. The singularity of the fruit, too, is enough to make it equally attractive. It is oblong, about 12 or 14 inches long, rather curved, a deep sage green, marked all over the surface by hexagonal meshes. These meshes, which are fleshy and easily separated from a soft, vinous, very fragrant pulp which lies beneath them, are the heads of so many ovaries; and so pricking are these to the tongue if it comes in contact with them that the person feels uncomfortable for hours afterwards. For a little foolish amusement, I have before now tempted persons unacquainted with the fruit to taste the underside of the covering, when they have declared that they should never forget it—not pain exactly, but uneasiness. When these heads are removed, the lower part of the ovaries, which is the part eaten, can be easily detached from the somewhat woody axis over which they stand in the closest possible order. I believe the plant is a native of the West Indies, and the fruit may be classed among the most delicious. At Dangstein it is cultivated in a house along with the graceful Banana, and some other tropical fruits.—*George Newlyn.*

TREES BY THE THAMES.—The Metropolitan Board of Works has determined on planting the Thames Embankment with trees, and the work has already commenced.—*Gardener's Chronicle.*

NOTES AND QUERIES.

WHAT'S IN A NAME?—As the subject of local or vulgar names and their origin has been brought before the readers of SCIENCE-GOSSIP several times recently, the following incident may not be deemed unworthy of notice. It happened one day lately that my sister was showing our gardener a collection of wild-flower drawings, and as she placed before him one of the woodbine, she remarked, "I did them all," at the same time asking him whether he recognized the flower, and knew its name. After some hesitation, he replied, "Didn't you call it 'I-did-um-all'?" This was said in such simplicity and good faith that, had he not been undeceived, he would assuredly have gone away under the impression that he had been told its correct name. It is not improbable that, through his means, the fragrant honeysuckle might have been handed down to succeeding generations under the bewildering and not very poetical title of "Ididumall;" thereby puzzling future botanists, and causing endless speculations and ingenious theories to account for the origin of so extraordinary a local name.—*M.G.*

VULGAR NAMES (p. 250).—Without at present discussing the accuracy of Mr. H. C. Richter's conclusions on this subject, although I entirely dissent from them, will he kindly tell me the *proper* name of the "little blue flower" which is in Wiltshire called "old sow"? I shall be glad to receive any other "vulgar names" which he may have on hand, to be sent either to the Editor, or to James Britten, High Wycombe.

BEE ODOURS.—A friend of mine who keeps several beehives asserted to me positively the other day that bees emit a strong smell when going to sting any one; he described it as a "pungent" smell. I told him I did not believe that bees did any such thing, and that he must be mistaken. I now ask your opinion on the subject.—*R. M. Bemington, Farsarse, Bray.*

GROWTH IN LEMON.—I have observed a similar growth of the seeds in an *over-ripe* lemon as described by Mr. Alfred Hume in the last number of SCIENCE-GOSSIP. The lemon was gathered from a large tree in our conservatory. I should imagine that such a germination of the seeds was not of uncommon occurrence in fruit left to decay on the tree. Fruit in this state, however, is not likely to reach the hands of our fruiterers here. I have always understood that oranges and lemons when gathered abroad for shipment to this country are plucked in a green and half-ripe state; therefore this would at once account for the supposed rarity of such an occurrence.—*I. G., Minehead.*

[Other correspondents furnish similar replies.—ED.]

LUCERNE FIELDS.—Mr. Melvill was quite correct in his surmise about clover and lucerne fields, which are very extensive in the neighbourhood of Deal, and I seldom observed *Colias hyale* out of these fields, although so plentiful this year; I also took *Acontia luctuosa*, one of the day-flying Noctuina, which is rather scarce in a lucerne field.—*H. C. Leslie.*

A CURIOUS FACT.—Whilst visiting a remote but rather considerable town in Lincolnshire, where I had not been for nearly twenty years, save on a few flying visits, I called upon an old schoolfellow, a chemist, and whilst talking with him a raven looked in at the door and received his accustomed bone. The bird had such a genial expression that I could not help asking his history. He belonged to the landlady of the principal hotel in the place; in fact, a pet bird. Accustomed to every luxury in feeding, but still a bird of prey, his raids, however, were friendly ones, and freely responded to; he had no need to cater for himself. In the hotel yard there was a small dog belonging to the ostler, not too well fed, and, out of love for him, this old bird—for he had been there twenty years—levied contributions on his mistress's best customers. The ostler married; in a fortnight he had to go through the greatest of earthly trials: his wife died. What could the poor fellow do? What should any of us do at such a time? He went every morning at his breakfast hour to the cemetery, some half-mile distant, to look at his wife's grave. The dog and raven went also; but he could not bear this long, and consequently obtained a situation some forty miles distant, but was not able to take his dog at first. The dog and raven, after his departure, as long as the dog was there, went alone every morning at the accustomed hour to the cemetery and stood reverently beside the grave of the poor fellow's wife. These facts could be attested by many of the townspeople.—*F. R. M.*

DOES WATER EXPAND ON BECOMING ICE?—When a bottle of water is frozen, the bottle is usually burst. Hitherto this has been explained by the assertion that the water on solidifying suddenly expands. M. Barthélemy, one of the professsors in the Lyceum of Pau, denies this explanation. In a memoir which he has written on the crystallization of water, he alleges that bursting of the bottle is caused by the disengagement of a large quantity of gas—hitherto in solution—by the water at the moment of its solidification. It is alleged in support of this that if a bottle of water be placed outside a window in frosty weather, it will be observed that the rupture takes place at the hottest side, viz., that next the window. Some of our correspondents must have made experiments on this point, and we shall be glad to hear what they have got to say to M. Barthélemy's opinion.—*Scientific Opinion.*

LITTLE MACKEREL.—Can any of your readers account for the mackerel being rarely found off the Barmouth coast as large as the mackerel usually seen in London, eight inches being about the average length of the fish there, and these are abundant?—*F. R. S.*

ARE CERTAIN EPIDEMIC DISEASES CAUSED BY INFUSORIA?—I have made experiments on myself, in a state of health, in order to ascertain if a diet exclusively vegetable or animal influences the development of those infusoria in the fæces. These experiments, which gave negative results, have since acquired vast importance. Suffering, some months later, from a violent attack of cholera, I again studied those fæcal matters, eight days after the commencement of the attack. I then found in them, at the moment of their expulsion, myriads of Bacteria, and of Vibriones, linear and chained, many of the latter having seven rings. I found also *Spirillum volutans*, Monads, and *Cercomonas crassicauda*. This observation, when compared with those preceding, is important; but it becomes still more so by a third inquiry which I have made. Two months after the commencement of my disease,

being entirely restored to health, I examined the excrements with a microscope, and found no infusoria. It was therefore to the cholera that their presence was due.—*Scientific Opinion.*

"WHY?"—Mr. Holland writes:—There is a misprint in your paragraph about *Utricularia:* instead of "after *germination* of the seed," it should have been "after the *formation* or *fertilization*." In case other readers of GOSSIP should credit me with this error, may I state that it is quoted from a little book called "Old English Wild Flowers"?—*B.*

HALF AND HALF.—Why do the fishermen of Norfolk, and probably of other places, call certain peculiar fish half one kind and half another? The subject was brought again under my notice by hearing one described as half Sole, half Butt; upon considering the question, I arrive at the conclusion that there is no such thing as a hybrid amongst fishes, and the reason that induces me to form that opinion is the particular mode nature has provided for their reproduction—viz., by the deposition of ova which the female does in such enormous numbers. It seems to me, if they were impregnated by a male of another species, the so-called hybrids would, instead of being the exception, if not the rule, be much more common.—*E. A., Norwich.*

DISEASED MOUSE.—The very peculiar looking mouse which we have received from our correspondent, Mr. T. H. O. W. Edmunds, we have examined carefully. The remarkable frontal development is due to disease of the skin, and not to an increased growth of the cerebral vault, which it much resembles. There is no apparent variation in the specific characters of the creature as occasionally happens in mice when the entire tegument is affected, and the body becomes hairless and thickened. An example of this kind was exhibited at the Zoological Society some years ago. Our correspondent's surmise that the "Cauliflower" excrescence is a "fungus growth" is justified.—*I. Murie.*

HOUSE MARTINS IN NOVEMBER.—I observed today (November 18th), in Exmouth, about a dozen House Martins busily hawking for insects round the shrubbery on the Beacon there. I think this is the latest date I ever noticed Hirundines.—*W. G.*

ALBINO BIRDS.—I do not know whether many of the correspondents of SCIENCE-GOSSIP have remarked the unusual number of albino varieties in birds this year. I have seen two piebald partridges which were shot September 2nd, and which would probably, when their moulting was over, have been quite white. I shot a yellow, or rather cream-coloured, sparrow with all its markings in bright brown and light grey, and I saw a piebald sparrow flying about. I have also seen and heard of other instances: amongst others, a white goldfinch, which I saw in a flock early in September, and I have read in the *Zoologist* of a white sparrow-hawk. What is the reason of this? Scarcity of any particular food would hardly have the same effect on sparrows, hawks, and goldfinches. Is it the heat which has had an unusual effect upon their constitution? I should be very glad if any one can tell me.—*E. G. Wheler.*

HOUSE ANTS.—My notice has lately been called by a friend to a curious fact concerning the likes and dislikes of those troublesome little house ants by which we have been visited this year. It has been noticed that although they will on every opportunity swarm over and devour beef or game or fish, yet they will never touch mutton. I should be glad to know if this circumstance has been previously noticed; if so, what conclusions have been drawn from it. I can also confirm the statement that soft soda, mixed with water, is efficacious in expelling them, for I find that after one or two applications of it to their haunts, they cease to appear.—*W. Murrell.*

HAWTHORN.—I enclose you a leaf of *Cratægus* gathered in a lane near here many years back, and which plant, with a little searching, I could again find. It appears to me to be entirely different from those figured in this month's SCIENCE-GOSSIP. Please to say which *you* say it is.—*Robert T. Andrews, Hertford.*

[The leaf was forwarded to Mr. Hepworth, and the following is his reply:—"The Hawthorn-leaf received from Mr. Andrews, though differing considerably from my figure of *C. oxyacanthoides*, is undoubtedly referable to that variety. It agrees with it in the most essential point, venation, and, though remarkably round, is three-lobed. The petiole, base, lobes, and principal veins are also, as in that variety, slightly ciliate. I have found leaves almost equally round, but smaller, on plants whose leaves, generally, agreed most nearly with those figured in SCIENCE-GOSSIP. A comparison of the leaf with the written description (which is evidently more comprehensive than the figure) will, I think, put the question beyond doubt. If Mr. Andrews will find out the tree in spring, he will, I have no doubt, find corroborative testimony in the flower and ovary."—*J. Hepworth.*]

DENDRITIC SPOTS ON PAPER are unquestionably fungoid growths. The plant usually penetrates the paper, and developes itself on both surfaces. I very recently made a careful examination of one, scraping it off the paper and mounting in balsam. The fragments so obtained are easily distinguishable from the fibres of the paper, and sufficiently transparent to allow a quarter-inch objective to be be used.—*J. T. Y.*

[Although our correspondent is very positive, we are not. We have studied Fungi a little for many years, and should not feel confidence to make such an assertion where there is really no satisfactory evidence.—*M. C. Cooke.*]

FUMART.—Will you kindly furnish me with some information respecting the Fumart? I found the name accidentally in a dictionary several years ago, and, although I have consulted a great many friends on the subject, and referred to several works on Natural History, Encyclopædias, &c., I have not been able to find anything farther than the dictionary definition, "The offspring of a bull and a mare." I feel curious to know if such an animal really exists, and if so for what purpose it is used, as well as its appearance and habits.—*W. Gain.*

NAVICULA HIPPOCAMPUS (*A. A., jun.*)—In reply to your correspondent's query, "Is Navicula hippocampus indicative of a fossil deposit?" I beg to say *Pleurosigma* (*Navicula*) *hippocampus* is a recent species, and may be found living in any pond or small stream. Smith, in the Synopsis, does not give other than recent localities for it, but it may be found in some of the so-called fossil earths (British), but it is very doubtful if any of them are fossil in the geological sense of the word.—*F. Kitton.*

RED DADDY.—This insect, described by I. Elphick, belongs to the order *Hymenoptera*, family *Ichneumonidæ*, but, as there are so many in this family, I cannot say exactly what its name is, from the description given. The "long, whip-shaped objects" that he mentions are *antennæ*, as the *sting* which the creature possesses is nothing more than a sharp instrument or bore, placed between two sheaths. Their use is to place the eggs in holes; they are very strong, and can hurt a person very much for the time. I do not understand what he means by saying that it is an "English insect, rare in its visits to *this country*." By this statement he makes it both indigenous and exotic at the same time.—*A. B.*

[Will Mr. Elphick send us specimens next year?—ED. *S. G.*]

CULTURE OF MISTLETOE.—Is it in the power of any of your readers to tell me how to grow the Mistletoe in Yorkshire? I have planted the berries, but quite without success.—*Edward Wood.*

[A late friend of ours some years since exhibited to us in his orchard numerous successful experiments of his own in cultivating the mistletoe on apple and other trees. He explained at the time that he took a ripe berry between his fingers, and, crushing it, rubbed it with the seeds into a crack of the bark on the *under* side of a branch. He laid particular emphasis upon rubbing in the seeds on the *under* side, so that they would not be washed out by the rain, or be so exposed to the birds. He had numbers of thriving plants in his orchard on different trees, all introduced by himself in this manner.—ED. *S. G.*]

FOLK-LORE.—In North York it is a popular saying that when acorns are plentiful there is always a large quantity of bad bacon. Our forefathers fed their swine largely on acorns and mast. I have rarely seen more acorns than there are this year.—*John Ranson, Linton-on-Ouse, York.*

HAWTHORN ERRATA.—In my paper on "Variation in the Hawthorn," by some mistake, either of mine or the printer's, the figs. 250 and 251 are wrongly placed. Fig. 250 belongs to *Crategus monogyna*, and fig. 251 to *C. kyrtostyla*. If you would kindly point out the error in your next impression, you would greatly oblige me.—*J. Hepworth.*

WHAT ARE THE FOSSILS?—My offer to send fossils from the coal-measures free of charge, to any of your readers who forwarded me an addressed luggage label bearing two postage stamps, has been responded to by hundreds of ladies and gentlemen in various parts of the United Kingdom, and, in addition to requests to forward fossils, several have asked me to name the specimens that were sent. As my time is very much occupied, and leisure is a novelty to me, I have been compelled to refrain from answering the queries individually, but with your permission I shall answer them generally through your pages, by describing the more ordinary fossils that have been distributed. They have been principally of three kinds, vertebræ, scales, and teeth. The vertebræ are of two kinds: large strong rings, about the size of a plain finger-ring, are vertebræ of *Megalichthys;* smaller rings, about a quarter or three-eighths of an inch in diameter, are the vertebræ of *Rhizodopsis*. The scales are principally of two kinds: flat, highly pleated, rhomboidal scales about the size of a thumb-nail, and not much unlike it, minutely punctured, are the body scales of *Megalichthys;* ovoid scales, with a central depression and radiating and circular striæ, are scales of *Rhizodopsis*. The teeth are of four kinds: large laniary piercing teeth from half an inch to one inch in length, dark, bright, and gently curved, are the teeth of *Megalichthys;* similar teeth, about one quarter of an inch long, are the laniary teeth of *Rhizodopsis;* teeth with two long blunt crowns, and a small and sharp elevation between them, are the teeth or tubercles of *Diplodus;* and the thin teeth, with from eight to twelve ridges or denticulations on the upper edge, the teeth being about one quarter of an inch square, and having the form of a diadem, are the teeth or dermal tubercles of *Ctenoptychius*. I feel confident that your numerous readers and my numerous correspondents will excuse me for addressing them generally through your pages instead of writing to each as individuals.—*T. P. Barkas, Newcastle-on-Tyne.*

THE RED DADDY.—The insect referred to in your last number under the title of "Red Daddy," from the nature of the tail, is probably *Panorpa communis*, the male of which, from its formidable-looking caudal appendage, is commonly called the "Scorpion-fly." The rest of the description is too vague to be any help to identification: the "whip-shaped" organs on the head for instance are doubtless the antennæ, which in some shape or other are common to all insects. The Panorpa is of frequent occurrence among damp herbage, but if it is the insect in question, the stinging powers of the "Red Daddy" are imaginary, as, like the rest of its order, the scorpion-fly is quite harmless, although popular prejudice has bestowed the name of "Horse-stingers" on some members of the same order. None of the great tribe either sting from the tail, though the females of many of the species have a formidable blood-sucking apparatus, of which our skins can often testify the efficiency; they are never furnished with more than two wings, but Panorpa rejoices in the possession of four, prettily spotted with brown. It may be observed that an "English insect" cannot be "rare in its visits to this country," as an *English* insect is not a *visitor* at all.—*George Guyon.*

GOLD-FISH FINS.—Whilst watching some Gold-fish in an aqua-vivarium a few days ago, I noticed that one of the fish had exactly the same peculiarity in its caudal fin as mentioned in last month's SCIENCE-GOSSIP by S. Morris. In another the abnormity was reversed, being situated on the upper portion of the tail. There was likewise a protuberance on the back of the latter, and a malformation in the anal fins of both, similar to that in last number's sketch.—*H. C. Sargent.*

VARIABLE LARVA OF N. ZICZAC.—Most of your readers will be familiar with the peculiar shape and rich colouring of the larva of *N. ziczac*. Last year I was so fortunate as to find two larvæ of a rich cream-colour, one of them larger than the usual size; but, as I was "green," I fed them up with other larvæ, so that I was not able to notice if the moth was unusually marked. This summer I found three of the larvæ of a bright golden colour. I have kept them separate, and as they have turned into the pupæ state all right, I shall be able to notice the difference (if any) when they hatch. Are the larvæ frequently found so very differently coloured?—*A. P.*

NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus: × 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals, should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. ADDRESS No. 192, PICCADILLY, LONDON, W.

AMERICAN DEPOSITS.—Two mounted slides of Diatoms received without name or address, asking for American Deposits in exchange. If correspondents will commit such errors, they must suffer disappointment.

J. B. C.—See SCIENCE-GOSSIP for 1865, pp. 42 and 66.

J. B.—Probably in the same way as birdskins, for which we have given instructions in earlier numbers of this journal.

G. H.—Consult SCIENCE-GOSSIP for September, 1865, p. 209, with figure.

H. G.—Not sufficient distinctive character in the eggs to name them.

W. E. S.—Newman's "Moths," in sixpenny numbers (Tweedie); Rye's "British Beetles," half a guinea (Reeve & Co.).

G. H.—"Disguises of Insects," SCIENCE-GOSSIP, 1867, pp. 193, 233, 234, 261, 279.

G. N.—Very probable. It must not be too long.

J. D. H.—*Vanessa urticæ*.

P. H. H.—Common enough. The small chrysalids were those of a parasite (*Ichneumonidæ?*).

T. W. wants to know how to determine the age of a parrot. We do not attempt to name anything from "brief description," not including specific characters.

G. D.—Election by ballot, and payment of an admission fee and annual subscription.

G. B.—1. *Dicranella varia*. 2. *Bryum atropurpureum*. 3. *Didymodon rubellus*.—*R. B.*

J. C. D.—1. *Atrichum undulatum*. 2. *Pellia epiphylla*.—*R. B.*

J. H.—Rye's "British Beetles," half a guinea. Reeve & Co.

R. G.—No. 1. an Alga. 2. *Bryum albicans*.—*R. B.*

A. J.—1. *Pseudoleskea atrovirens*.—*R. B.*

EXCHANGES.

BRITISH BIRDS' EGGS for Insects.—G. H. Hunt, St. Augustine's, Norwich.

EUROPEAN UNIOS AND ANODONTAS wanted in exchange for British Shells.—Send lists of duplicates and desiderata to W. White Walpole, Holmwood, Kingston-on-Thames, Surrey.

SECTIONS OF LABURNUM, Sassafras, Sarsaparilla, Fuchsia, and Lime-tree for other good mounted objects.—Send lists to J. Green, jun., 16, Pump-Street, Londonderry.

EGGS OF BRITISH BIRDS for other Eggs or Lepidoptera.—J. M. Hick, Byers Green, Willington, Durham.

MNIUM STELLARE (barren) and *Hookeria lucens* (in good fruit) for *Anomodon longifolius*, or any of the *Trichostoma*, except *tophaceum*. Also *Tortula papillosa* for *T. rigida* or *ambigua*.—Address, A. Jerdon, Highfield, Melrose, N.B.

SILICEOUS DIATOMACEOUS DEPOSIT, Wings and Scales of Butterflies, various (mounted), in exchange for any objects of interest (mounted or unmounted).—A. Angell, Friary Cottage, Winchester.

BRITISH PLANTS in exchange for other British Plants.—Send list to J. C. Hutcheson, 8, Lansdowne Crescent, Glasgow.

POLLEN OF LILIUM LANCIFOLIUM, PUNCTATUM, OR RUBRUM (unmounted), exchanged for unmounted microscopic objects of interest (named).—Address, enclosing stamped envelope, C. E. Osborn, 28, Albert Road, St. John's Ville, Highgate, N.

EGGS OF NORTH AMERICAN BIRDS (46 eggs, 14 species) offered for Eggs of British Birds.—"Maine," care of the Editor.

BRITISH LICHENS (90 species) and European Grasses (27 species) for exchange.—W. H. G., 15, Thornhill Road, N.

EXCHANGES.—We must caution exchangers against sending out such slides as we have lately seen under the description of "good slides," that are not worth the *unground* glass on which the objects are mounted. Persons permitting such slides to leave their own cabinets have very little regard for their reputation, and deserve to have them returned.—ED. *S. G.*

BOOKS RECEIVED.

"Scientific Opinion." Nos. 4, 5, 6, and 7. London: Wyman & Sons.

"Proceedings of the Bristol Naturalists' Society." Vol. III., No. 8, November, 1868, Bristol.

"The American Naturalist." Vol. II., Nos. 9 and 10, November and December, 1868. Salem: Peabody Academy of Science.

"Annual Report of the Smithsonian Institution for 1866." Washington: Smithsonian Institution.

"The Gardener's Magazine." Part XXXVI., for December, 1868. London: E. W. Allen.

"The Quarterly Journal of the Folkestone Natural History Society." No. 1, December, 1868. Folkestone: *Express* Office.

"Sciography, or Radial Projections of Shadows." By R. Campbell Puckett, Ph.D., Head Master of the Bath School of Art. London: Chapman & Hall.

"Fifth Annual Report of the Belfast Naturalists' Field Club," 1867-8. Belfast: Field Club.

"Land and Water." No. 152, December 19. 80, Fleet Street.

"The Naturalists' Circular." For December.

COMMUNICATIONS RECEIVED.—J. E. T.—J. B. C.—J. B.—G. H.—G. H. H.—W. L. W.—J. M.—T. H. O. W. E.—H. F. W.—T. W. W.—J. Y. H.—H. G.—W. G.—W. M.—W. Murrell—C. W.—S. S.—C. (Barnsbury).—G. B.—J. H.—J. S.—W. E. S.—G. H.—T. P. B.—A. A., jun.—J. G., jun.—J. M. H.—H. H. K.—W. H. D.—G. N.—A. B.—E. A.—J. R. S. C.—B.—J. V.—L. G. M.—F. W. B.—H. E. W.—T. W.—P. H. H.—A. P.—H. H. K.—W. C.—A. B.—J. T. Y.—H. C. S.—J. D. H.—T. B. H.—F. R.—G. G.—C. L. C.—A. B. H.—T. McC.—S. S.—E. W.—W. P. M.—A. J.—A. A.—J. R. E.—T. P. B.—H. L. W.—J. C. H.—J. H. M.—G. B.—G. D.—C. E. O.—J. W.—W. W. S.—J. W.—W. P. M. (too late).—B. T. H. M.—G. R.—H. M.—S.—J. H.—W. H. G.—F. A. H.—R. B.

ENGLISH PLANT-NAMES.

What's in a name? That which we call a rose,
By any other name would smell as sweet.
SHAKESPEARE.



AMONG the many quotations from the works of our great dramatist which are continually "cropping up" in our conversation—which, as it were, have so fixed themselves upon our memory that we cite them all unconsciously, sometimes not even knowing whence they come—there is not one more hackneyed than that which heads this paper. So hackneyed is it, that we have come to regard it, not only as stating, in its literal sense, an incontrovertible fact, but as containing an insinuation at least, that there is really little or nothing in a name, after all.

In the present paper, I am going to attempt to show that there is, in many cases at least, a great deal in a name. I deprecate most strongly a statement which appeared in a recent number of SCIENCE-GOSSIP, that "an examination of the common or vulgar terms applied to plants and animals will at once introduce us to a complete language of meaningless nonsense, almost impossible to retain, and certainly worse than useless when remembered—a vast vocabulary of names, many of which signify that which is false, and most of which mean nothing at all." I have for some time been engaged in collecting the local names of plants, and, as far as they are concerned, I find very few which have no signification,—and doubtless even these few will, in course of time, be explained; while, in the majority of cases, there is not only a meaning, but a very good and appropriate reason for the name.

It is only those who have given, at any rate, some slight attention to this subject of local names, who can at all comprehend the multiplicity of sources from which they have been derived. The names of our birds are less numerous, and, to my mind, less interesting; although doubtless Mr. Holland, to whom the lists sent to SCIENCE-GOSSIP have been intrusted, will show that among them there is ample food for reflection: but the varied uses and associations of plants—religious, medicinal, ornamental, poetical, domestic—have each contributed to swell the list, and the result is both curious and instructive. When, in the earlier days of this magazine, the Editor intimated his willingness to become curator of any lists of names which might be sent, until it should be decided how to make use of them, he probably did not expect so hearty a response to his proposition. Many of the lists sent are far too copious to include in a paper short enough for insertion; a whole number of GOSSIP might be filled with them alone, without note or comment. This will, I hope, be considered a sufficient apology for the non-appearance of much interesting information in the present paper; a second one is in preparation, which will include many names here omitted; but a volume is needed to do the subject justice. Mr. Holland and myself hope at some future period to publish such a volume: and any contributions or suggestions addressed to Robert Holland, Mobberley, Knutsford; or to James Britten, High Wycombe, will receive due attention. The thanks of all who may find in this paper anything worthy of note, are due to the following contributors:—"R. W.;" "C. A.;" "M. H.;" "G. B. C.;" "J. S., Jun.;" "F. G. B.;" "J. B.;" "T. F. W.;" "G. S.;" "F. M. H.;" "R. E. D.;" "V. A. S;" "W. B;" "W. S;" "L;" "J. B." (Cockan); "L. S.;" "T. S.;" and others; for from them many of the names referred to have been received. Mr. Holland's assistance has been of especial value to me; and for much of the information regarding the derivation of plant-names I

am indebted to Dr. Prior's interesting work "On the Popular Names of British Plants." With these necessary, if tedious, prefatory remarks, I will enter upon my subject.

It must be remembered that it is no argument against the appropriateness of these common names that the reasons for which they were given are now forgotten by those who use them; and that the names themselves are often so corrupted that it requires some ingenuity to discover what they were originally. They were doubtless expressive and comprehensible to those who first invented and used them; and the wide distribution of many of them is sufficient proof that they were generally accepted as such. In the first place, then, I will endeavour to show what languages enter into our English plant-names, illustrating each by a few examples, types of numberless others, which might be cited, did space permit.

We are all familiar with the Hawthorn (*Cratægus oxyacantha*), and we call its red fruit "haws." Further north, however, as in Cheshire, Lancashire, and Yorkshire, they are known as "haigs" or "hagues." For the meaning of these words, we must refer to the Anglo-Saxon, where we shall find hawthorn rendered *hagaðorn*, *hægðorn*, or *hegeðorn*, which closely corresponds with the German *hagedorn*. From this we may gather that the Hawthorn was employed from very early times in the manufacture of our hedges (A.-S. *haga*, or *hæge*, perhaps from the Icelandic *hegna*, to fence round); and possibly its general use for that purpose may have led to the application of *haga*, first to the shrub of which the fences were formed, and, in later times, to the fruit of that shrub. Mr. Holland, however, thinks that A.-S. *hæg*, a hedge, was derived from the tree, and not the name of the tree from the place of its growth; for this simple reason, *hagaðorn* would mean "the thorn-tree bearing *hægs*;" and in A.-S. times *hægs* probably referred, as they do still, to the fruit rather than to the shrub bearing them. *Hag*, or *haga*, then, would be A.-S. for the fruit; *hægðorn*, the tree bearing the fruit; and that being used in the making of fences, a fence was therefore called *haga* or *hæge*. In Cheshire and Lancashire the origin of Hawthorn is more apparent, as it is there called "Haythorn;" and in Norfolk a hedge is a "hay." Haguebush or Hagbush Lane, in the north of London, formerly a favourite resort for artists, but now doubtless covered with bricks and mortar, meant originally Hawthornbush Lane. But we have not yet done with *haga*. The Great Mullein (*Verbascum Thapsus*) is, in modern books, called High-taper, and this name is explained as referring to the resemblance of its tall yellow spike to the candles which formerly stood on the altars of our churches. Here we have an illustration of the readiness with which a reason may be invented to account for a name. Gerarde and our older herbalists spelt it Hig-taper, which, being incomprehensible to some, was transformed into High-taper, and the above meaning added. Yet Hig-taper, or Hag-taper, was the original word; the "taper," perhaps, referring to the tall stem of the plant, the affix "hig" being A.-S. for hay, or if we take "hag" as the correct form, referring to the usual place of growth of this Mullein—*viz.* hedgebanks. The Buckinghamshire names, "agg-paper" and "agg-leaf" countenance the latter notion: here we observe another corruption, that of "taper" into "paper." "Agg-leaf," however, is a sensible name enough; the plant is a biennial, and the prominence of its rosette of large flannel-like *leaves* on the *hedge*bank during the first year of its existence, would attract observation, even though without blossom. Every one knows the long hooked stems and small burs of the Cleavers, or Goosegrass (*Galium Aparine*), which fasten upon and persistently adhere to our clothing. In the northern and midland counties this has a very curious name, spelt by different correspondents heriff, hayriff, herriff, ayriff, airup, aireve. Here, again, we have *hæg* entering into the composition of the name of another hedge-plant; for all these forms are from the A.-S. *hegerife*. Dr. Prior derives the second half of this word from A.-S. *reafa*, which, he says, "significantly enough, means both a tax-gatherer and a robber." A writer in the *Athenæum*, however, prefers to take the verb *reafian*, to seize, to lay hold of, as its origin. In either case, no one will deny the suitability of the epithet; but it is worthy of note that here we have an example of the transferring of a name from one plant to another; as the Burdock (*Arctium Lappa*) was the original *hegerife* (Prior). The term is equally appropriate to both; but, curiously enough, while it is applied to the Cleavers in many lists, I have not noted a single instance of its connection with the Burdock. It has been attempted to show that the word herriff is merely a contraction of hair-rough, referring to the rough hairs with which the plant is clothed; but the derivation from the A.-S. above given is the more satisfactory. It receives a curious confirmation in the Cumberland names of the plant: "Rob-run-up-dyke," and "Robin-run-up-dyke;" and the Dublin one, "Robin-run-the-hedge;" which look very like translations of *hegerife*, robber-run-up-hedge; robber having been corrupted into Robin, or abbreviated into Rob. *Haga*, or *hæg*, enters into the old names Haymaids and Heyhove for the Ground Ivy (*Nepeta glechoma*), into Hagberry (or, in Cumberland, Heckberry) for the Wild Cherry (*Prunus avium*), and others which we cannot now stop to consider.

That most troublesome weed to farmers, the Couch-grass (*Triticum repens*), has a variety of names. In Cumberland and Essex it is Twitch; in Cheshire and Shropshire, Scutch; in North Buckinghamshire, Squitch; in South Buckinghamshire,

Couch- or Cooch-grass; all evidently having the same derivation, but an obscure one. In the Norfolk "Quicks," and the Warwickshire "Quicken-grass" we have a clue. No plant is so retentive of vitality as this *Triticum repens;* the smallest piece left in the ground will grow. All these names are but forms of the A.-S. *cwic*, living, a word with which we are familiar as occurring in the Apostles' Creed in the English Prayer-book, where "the quick" are referred to in opposition to "the dead." The words "quicks" and "quickset" are applied to living hawthorn hedges as distinguished from dead-wood fences; *cwic-beam*, the living tree, was, according to Dr. Prior, the A.-S. for the Aspen (*Populus tremula*), on account of its ever-moving leaves; and Quick-in-hand was an old name for the Touch-me-not (*Impatiens Noli-me-tangere*), from the suddenness with which its seeds discharge themselves when handled.

The Kentish name for the Early Purple Orchis (*Orchis mascula*) is "Skeat-legs;" this is also, but less generally, applied to other orchids. The A.-S. word *scæt*, or *sceat*, meant any description of wrapping, or swathing, clothing, such as a sheet, which is from the same word; *sceata* meant a woman's skirt, or the lower flapping part of a sail, and *scæd*, a loose sheath. The appropriateness of the name Skeat-legs to most of our orchids, but especially to *O. mascula*, will at once be readily recognized; describing the stem, or "leg," partially enveloped in a sheathing leaf. This is an excellent example of the way in which a name, apparently meaningless, may be shown to have really arisen in a natural peculiarity of the plant to which it applies. I am indebted to Dr. FitzGerald, of Folkestone, for its explanation.

Many north-country names are derived from Swedish and Danish sources. The black heads of the Ribwort Plantain (*Plantago lanceolata*) are, in the northern counties, called kemps. We find the origin of this in the Danish *kæmpe*, A.-S. *cempa*, a warrior. Children often play with the flower-stalks, each endeavouring to knock the head off the other's mimic weapon; and this game is still known in Sweden, where the stalks are called kämpar (Prior). The same game is very popular with the Cheshire children, who term it "playing at conquerors;" the heads themselves they call "fighting cocks." Rushes (*Junci*) are called sivs and seaves, from the Da. *siv*, Sw. *sæf*, a rush. The name Roan, Ran, Royne, or Rowan-tree, by which *Pyrus aucuparia* is known in Scotland and the northern counties, comes from Da. *rönn*, Sw. *runn*, which is traceable to the "O. Norse *runa*, a charm, from its being supposed to have power to avert the evil eye" (Prior). *Vaccinium Myrtillus* is, in Cumberland and Yorkshire, known as Blue-berry, in Scotland Blae-berry, from Sw. *bloa-bær*, or Da. *böllebar*, a dark berry; its more ordinary name, Bilberry, is probably from the same source.

Space will not allow us to do more than glance at the names derived from the Welsh; these do not occupy a prominent position in our lists, and may therefore be dismissed with a short reference. Grig, the Shropshire and Cheshire name for the Ling (*Calluna vulgaris*), is the Welsh *grwg*, which is so pronounced; Gromwell (*Lithospermum*) is in Welsh *grwmmil*, a contraction of *grawm-yr-haul*, "grains of the sun," the bright shining seeds of *L. officinale* and other species having probably given rise to the name. Dr. Prior, however, favours a different derivation.

From the German and Dutch we obtain several of our commonest plant-names. Buckwheat (*Polygonum Fagopyrum*), for instance, is from Du. *boekweit*, G. *buchwaitzen*, beechwheat, "from the resemblance of its triangular seeds to beechnuts, a name adopted with its culture, from the Dutch" (Prior). The Figworts (*Scrophularia aquatica* and *S. nodosa*) take their name, Brown-wort, from G. *braunwurz*, probably in reference to their dark foliage and brown stems and flowers. Dr. Prior thinks it more probable that it is from the plants "growing so abundantly about the *brunnen*, or public fountains of German towns and village;" but the former derivation seems to me the more likely, especially as neither species is peculiar to these localities. In Devonshire the name Brunnet is applied to one or both species: this is probably a corruption of brown-wort, or possibly an abbreviation of brown-nettle; the word Burnet is not very different from this, and that is applied to a brown-stemmed plant (*Poterium Sanguisorba*).

Names of French origin are yet more frequent. The Dandelion (*Leontodon Taraxacum*) gives us a familiar example; it is in French *dent-de-lion*, lion's tooth, although the reason for the name is not satisfactorily known. At Glasgow the Gooseberry (*Ribes Grossularia*) is called groset; in other parts of Scotland, grosert, grose, and groser: the Black Currant (*R. nigrum*) is gazles in Sussex; and in Kent the same name is applied to the White Currant. We find the origin of all these words in the Fr. *groseille*. In the Ayscough MSS., as quoted in *Notes and Queries* (Series IV. i. 532), we read that the Raspberry (*Rubus Idæus*) is called framboise by the country people in Dorset; and the S. George's Mushroom (*Agaricus Georgii*) is known as champeron to the people about Abingdon. Mushroom itself, by the way, is but an anglicised form of Fr. *mousseron*, formerly *mouscheron*. "One of the most conspicuous of the genus (*Agaricus*), the *A. muscarius*, is used for the destruction of flies, *mouches;* and this seems to be the real source of the word, which, by a singular caprice of language, has been transferred from this poisonous species to mean, in the popular acceptation of it, the wholesome kinds exclusively" (Prior). Tutsan (*Hypericum Androsæmum*) is from Fr. *toute saine*, a name by which it has been known

since the time of Gerarde, who gives this explanation of it. In Buckinghamshire a corrupted form of this is still in use in the words Tipsen-leaves and Touch-and-heal; in Hampshire it is Touchen-leaves. In the second of these we have an example of the tautology so frequently found in English names where foreign words have been translated, and then both original and translation have been combined. The "Touch-and" is the same as Touchen, and is evidently a corruption of *toute saine;* the "heal" is a translation of *toute saine*. It has been converted into Touch-*and*-heal to make sense of it: and the word is now, perhaps, supposed to indicate the rapidity with which the healing properties of the plant take effect.

Many Latin and Greek names, introduced, like the knowledge of the plants bearing them, by the monks, have become anglicised. From the former we derive Plantain, Bistort, Medick, Rose, Saxifrage, Violet, Feverfew, Sanicle, Vervain, Centaury (and its corrupted form, Sanctuary); from the latter, besides the Latin originals of many of the foregoing, we have Leopard's Bane, Coral-root, Coriander, Swallow-wort, Spleenwort, Daffodil, "Mazalion" (by which name *Daphne Mezereum* is known in Buckinghamshire), Celandine or Salardine, and many more. Besides these, we have some which, apparently English, are really corrupted from the Latin: Herb Bennet (*Geum urbanum*) is an abbreviation of *herba benedicta*, the blessed herb, a name given on account of the many virtues formerly attributed to it: Mill-mountain (*Linum catharticum*) is, according to Dr. Prior, a corruption of Cha-*mæl*-inum *montan*-um, the old scientific title of the plant. The first half of the Dumfries name for the Coltsfoot, "Tushy-lucky gowan," is doubtless from the Latin *Tussilago*.

From Latin names, the transition to another class, in a measure connected with them, and introduced by the same agency, is an easy one; I refer to what I may term religious plants, such as have been in some manner associated with, and have taken their titles from, the pious observances of former times. The Church taught by the eye as well as by the ear; and by natural objects sought to recall not only, as we shall presently see, her more solemn seasons, but the saints whose festivals she kept. The coincidence, for example, of the flowering of a plant with the feast of a saint led to a connection between the two, and eventually, in many cases, the name of the latter was bestowed upon the flower. A natural feeling of reverence seems to have prevented, at any rate in England, the dedication of plants to either person of the Blessed Trinity; and the few exceptions to this rule with which I am acquainted are associated with our Lord in His human nature exclusively. The Blessed Virgin, however, who held a foremost place among the saints, is commemorated, under the title of "Our Lady," by which she was formerly most generally known in England, in the Lady's Bedstraw or Bedestraw (*Galium verum*), Lady's Smock (*Cardamine pratensis*), Lady's Finger (*Anthyllis vulneraria*), Lady's Tresses (*Spiranthes autumnalis*), Lady's Comb (*Scandix Pecten*), Lady's Mantle (*Alchemilla vulgaris*), and very many more. During Puritan times, it became the custom to substitute the name of Venus for that of the Blessed Virgin. Thus, Lady's Comb became Venus's Comb, and so on; and this substitution was fostered by the false classical spirit which became fashionable during and after the reign of Charles II. The Rev. W. Jones, of Nayland, a celebrated Anglican clergyman of the last century, refers in terms of severe reprobation to this alteration, in his "Reflections on the Growth of Heathenism among Modern Christians." It must not, be supposed that "lady" always has the above signification; Lady Fern, for example, is simply a translation of *Filix fœmina*. The names Marygold and Marybud are generally supposed to have a similar allusion, but Dr. Prior doubts this; Virgin's Bower (*Clematis Vitalba* and *C. Flammula*), and Virgin's Thistle (*Carduus Marianus*), however, undoubtedly refer to the Blessed Virgin. In Hampshire the Lungwort (*Pulmonaria officinalis*) is called "Joseph and Mary." At first sight, this might seem difficult of explanation; but a little investigation soon enlightens us as to its meaning. It will be noticed that the flowers of this plant are pink or red when they first expand, becoming blue when they arrive at maturity. In mediæval paintings and stained glass, and hence doubtless in the once popular miracle plays, S. Joseph was represented chiefly in red, and the Blessed Virgin in blue. The union of the two colours in the blossoms of the same plant will account for the name. Lords-and-Ladies (*Arum maculatum*) is thought by some to be a corruption of "our Lord and our Lady," the resemblance of the spadix, enshrined, as it were, in the spathe, suggesting the idea of a statue of the Virgin and Child beneath a canopy. Mr. Holland, however, writes, "I think most country people who use the name Lords and Ladies think that the plant is so called because the spadices are sometimes red and sometimes white, the white ones representing 'ladies,' the red, 'lords.' If this name were derived from a statue of the Virgin and Child, it would probably have been called Lord-and-Lady, and not by these words in the plural form. In Cheshire, on the 29th of May, children thus distinguish between the reddish leaves of the oak and the green ones, the red ones being called 'girl's oak,' the others 'boy's oak.' Girls decorate themselves with the former, boys with the latter." Among plants popularly dedicated to other saints, we may notice S. John's Wort (*Hypericum*, especially *H. perforatum*), in many places corrupted into Sinjonswort, which blossoms about St. John the Baptist's day,

June 24; St. James' Wort (*Capsella bursa-pastoris*), and many more will be found in herbals. In some cases, however, we must admit that names, referred by modern writers to a similar dedication, have really a very different origin. Herb Bennet, for instance, is said to commemorate St. Bennet or Benedict, although, as I have shown, it has a very different origin; Timothy-grass (*Phleum pratense*), which really took that name from being brought into cultivation by one Timothy Hanson, is supposed to have been dedicated to St. Timothy; Paul's Betony (*Veronica officinalis*), which, according to Dr. Prior, refers to an old author, Paul Ægineta, who described it as a betony—to St. Paul; and so on. In the floral kalendar, the Church's seasons were duly noticed. The Holly (*Ilex aquifolium*), from its use in church decoration at that season, is in many places still called Christmas; the Snowdrop (*Galanthus nivalis*), in its old name "Fair Maid of February," commemorates the feast of the Purification (Feb. 2); Lent brings its Lent lilies (*Narcissus pseudo-Narcissus*); Palm Sunday its "palms," as the willow catkins are pretty generally called; Easter, its Paschal, or Pasque, flower (*Anemone Pulsatilla*); the days preceding the Ascension are referred to in Rogation-flower or Procession-flower (*Polygala vulgaris*), which received its name from its use in the garlands which were carried in the religious processions which marked Rogation-week; Herb Trinity (*Viola tricolor*) pointed to Trinity Sunday; the Virgin's Bower (*Clematis*) to the Assumption; and the Michaelmas Daisy (*Aster*) to the feast of SS. Michael and All Angels. In these enlightened ages we are not supposed to need such aids to faith; but let us not despise the efforts made in bygone days to bring religion into the daily life of the people by means of the objects which God Himself had created, and which He Himself has told us to "consider."

But we must pass on to the consideration of another class. Many plants take their names from a resemblance, real or imaginary, to animals, or parts of animals. The tail-like inflorescence of some has suggested many names; amongst which are Mouse-tail (*Myosurus minimus*), with the carpels arranged on the long slender receptacle; Cat's-tail (*Typha latifolia*), with a thick stout spike, a name applied also to *Phleum pratense* (in Cheshire this grass is called Rat's-tail, a title given, in Cumberland, to the Plantain (*Plantago major*); Hare's-tail (*Lagurno ovatus*), remarkable for its soft flowerheads; Squirrel-tail (*Hordeum maritimum*); and Dog's-tail (*Cynosurus cristatus*). The Horse-tails (*Equiseta*), flowerless plants, have their long slender branches growing in whorls up the barren stem: the name is particularly appropriate to *E. maximum*. The gaping corolla of the Snapdragon (*Antirrhinum majus*) has suggested, not only that appellation, but the allied ones, Rabbit's-mouth, Lion's-snap, and Dog's-mouth; in Buckinghamshire the Toadflax (*Linaria vulgaris*) is called Dragon-bushes. Dr. Prior says that "snap" is from the Dutch *sneb*, a snout; so that Snapdragon means simply Dragon's-snout. In Sussex some of these names are transferred to the Foxglove (*Digitalis purpurea*), which is known at Brighton as Tiger's-mouth, Dragon's-mouth, and Lion's-mouth; the wide-open spotted corolla having suggested the titles. The names *Geranium*, *Erodium*, and *Pelargonium*, with their English equivalents, Crane's-bill, Heron's-bill, and Stork's-bill, originated in the long beaked carpels which characterise the various species of those genera. The Hart's-tongue Fern (*Scolopendrium vulgare*) took its name from the shape of the fronds; in Dorsetshire it is called Hoss (or horse) tongue: the narrow slender spike of *Ophioglossum vulgatum* accounts for its name, Adder's-tongue: according to Dr. Prior, the Sneezewort (*Achillea Ptarmica*) is Goose-tongue, "from its finely serrated leaves;" the Hoary Plantain (*Plantago media*) is Lamb's-tongue; *Helminthia echioïdes* is Ox-tongue, "from the shape and roughness of its leaf;" while the softness of the foliage of *Cynoglossum officinale* probably suggested its Greek name, of which the English, Hound's-tongue, is but an equivalent. The shape of its leaf shows the appropriateness of Colt's-foot, as applied to *Tussilago Farfara;* in Cumberland and Yorkshire this is called Foal-foot, by which it has been known since the time of Gerarde: other names for it are Bull's-foot and Horse-hoof. It is not so easy to explain the meaning of Crowfoot, by which various species of *Ranunculus* are known; for if we imagine it to have originated in some fanciful resemblance in the shape of the leaves, the same reason will not account for its application, in Yorkshire and Cumberland, to the Early Purple and Green-winged Orchids (*Orchis mascula* and *O. morio*), unless we suppose that, from the buttercups and orchids growing together, the name may have been extended from one to the other. The Bird's-foot (*Ornithopus perpusillus*), and Bird's-foot Trefoil (*Lotus corniculatus*) point to the likeness, in the former a very striking one, of the heads of seedpods to a foot or claw: in Buckinghamshire the latter is called Cat's-claws; in Warwickshire, Lambtoes; and elsewhere, Crowtoes. The long projecting nectary of many species of *Delphinium* suggested the name Lark's-spur, or Lark's-claw; a name which is applied in Buckinghamshire to the Toadflax (*Linaria vulgaris*), from a similar peculiarity in its blossoms. The soft heads of *Trifolium arvense* render Hare's-foot appropriate; those of the Kidney Vetch (*Anthyllis vulneraria*) are called Lamb-toes; *Dactylis glomerata* is Cock's-foot, from the shape of the panicle (Prior).

Any one who will take the trouble to look through a list of English plant-names will not fail to observe that many of them have the name of some animal entering into their composition, used in a different

sense from those which we have been considering. In a former number of Science-Gossip, I alluded to the meaning which "horse" has in composition—*i. e.*, large, or coarse,* as in horse-chestnut, horse-blobs, horse-gowans, and many more. "Dog," as an affix, usually conveys worthlessness: thus we have Dog Violet, a scentless species; Dog's Grass (*Triticum repens*), a useless species of a genus which contains wheat (*T. sativum*); Dog's Camomile (*Matricaria Chamomilla*); &c. This is not always its meaning; the Dogwood (*Cornus sanguinea*) means dagge-wood, *dagge* being the old English equivalent for a dagger, and the wood having been used for skewers (Prior). In Buckinghamshire it is still called Prickwood and Skewerwood; thus confirming the above explanation. In Cheshire and Lancashire, the Guelder Rose (*Viburnum opulus*) is called Dog-eller; this may mean "worthless elder," from the "family likeness" between the *Viburnum* and *Sambucus nigra;* or here again; "dog" may mean "dagger," and dog-eller, skewer-eller, or elder: in Lancashire, skewers are still made of it. It has been suggested that Guelder Rose may be but an abbreviation of Dog-elder Rose; but the general supposition is, that the cultivated form (the "Snow-ball-tree") was brought from Gueldres, in Flanders, and thence took its title. Dog Rose (*Rosa canina*) *may* mean, *par excellence*, Prick-flower, a very appropriate name for it; but cultivated roses are equally prickly, so that it probably implies a worthless rose. "Ox," "bull," or "cow," differ somewhat from "horse" in composition; they imply something large, but not of necessity coarse. Bulrush (*Scirpus lacustris*) is thought by Dr. Prior to have been originally *pool*-rush, "from its growth in pools of water, and not, like the other rushes, in mire;" but Mr. Holland considers that the name simply denotes a large rush, as in Cheshire, although the word bulrush is in use, the small ponds are never called pools, but always pits. The two species of Cat's-tail (*Typha latifolia* and *T. angustifolia*) are known in Warwickshire and other places by the same name. "Toad" means false or spurious: Toadflax, for example, means, as I have before endeavoured to show,† a false flax, from its superficial resemblance, when out of flower, to the flax of commerce; Dr. Prior, however, favours a different derivation.

Some names have a generic signification—that is, are applied to many plants having some feature in common. A notable instance of this may be found in the word "Cuckoo," which not only enters into Cuckoo's-meat, Cuckoo-flower, and Cuckoo-bud (names themselves applied to more than one plant), but is used indiscriminately for all spring blossoms. I first noticed this in Essex, while endeavouring to ascertain the local names of some May flowers. Every plant which had no other title was called a Cuckoo; and I find the same principle in Buckinghamshire, only there an adjective of colour is prefixed, according to the different blossoms to which it is applied; as "Pink Cuckoos," *Geranium Robertianum;* "Blue Cuckoos," *Veronica chamædrys;* "White Cuckoos," *Stellaria Holostea*. As it is spring flowers alone that are thus called, it is evident that the simultaneous appearance of the Cuckoo and the blossoms has suggested the extension of the name from the one to the other. "Bird's-eye" is another term applied to many spring-flowering plants. Rose is bestowed upon many species which have no connection, except in name, with the genus *Rosa;* as Rose-a-ruby (*Adonis autumnalis*); Rose of Sharon, the Lancashire name for *Hypericum calycinum;* Christmas Rose (*Helleborus niger*). Violet, again, is embodied in Dame's Violet (*Hesperis matronalis*); Toothed Violet (*Dentaria bulbifera*); Corn Violet (*Specularia hybrida*); Water Violet (*Hottonia palustris*); none of which are in any way related to the genus *Viola*. Nettle (A.-S. *netel*), which belongs properly to the genus *Urtica*, is now extended to many plants with similar leaves. Various species of *Lamium*, especially *L. album*, are known as Dead, Blind, Deaf, and Dumb (or, in Bucks, Dunny) Nettle. Another genus of labiate plants is Hemp-Nettle (*Galeopsis*), one of which, *G. Tetrahit*, is, in Berwickshire, Dog-Nettle. Gowan is generally applied in Scotland and the northern counties to the Daisy (*Bellis perennis*), which, however, was not the original owner of the title. Gowlan, Gowan, and Gowles all have the same meaning—*i.e.* golden The Globe-flower (*Trollius europæus*) is, in Scotland, Locken-gowlan; locken meaning closed up, in reference to the way in which the sepals fold over. The Marsh Marigold (*Caltha palustris*) is Water-gowlan; the Corn Marigold is Gowles, Gulls (in Cumberland), and Goldins; and these all have yellow flowers. How the name was transferred from yellow-blossomed plants to those which are chiefly white, it is difficult to explain; yet the Daisy is now Gowan, while the Oxeye (*Chrysanthemum Leucanthemum*) and Mayweed (*Anthemis Cotula*) are Horse-gowans. Then we have the word Cress, the meaning of which is at present very obscure. In Buckinghamshire, the Buttercups (*Ranunculus bulbosus, acris*, and *repens*) are called Butter-creeses and Yellow-creeses. In Warwickshire they are termed Crazies, and yet these do not bear even a remote resemblance to those which in books are called cresses, and which generally belong to the *Cruciferæ*. Dock (A.-S. *docca*), which is usually applied to the various species of *Rumex*, is locally appropriated by many plants having large coarse leaves. For example, Water-lilies (*Nymphæa* and *Nuphar*) are, in Cheshire, Flatter (or floating) docks, and the Butterbur (*Petasites vulgaris*) is Batter-dock. *Arctium* is generally called Burdock, the

* Science-Gossip, iv. 266. † Ibid. iii. 202.

dock which produces burrs; and the Mallow (*Malva sylvestris*) is Round-dock Sedge, serge, segs, or seggins—A.-S. *sæcg*, a small sword, from the sharp foliage—is applied by the ignorant to nearly all plants with lanceolate leaves, even to the Polyanthus Narcissus. Mr. Holland states that among country people in many places much less attention is paid to the distinctions to be observed in the flowers than to the differences to be seen in the leaves of plants, and the above instances support this conclusion.

And here, for the present, I must leave the subject. I had intended to direct attention to the large class of names which are applied only to one or two species; to show the peculiarities from which these names originated; and to point out how many have been suggested by the likeness of parts of the plants bearing them to some natural or well-known object, or by their use in certain diseases, and how many names of places and people are derived from plants. I would have mentioned some which have an ominous sound, some which are quaint, some which are amusing, some to which curious legends are attached. Space, however, will not allow me to do this on the present occasion; and this paper must be taken rather as giving a general idea of the various sources whence plant-names are derived, than as showing the fitness of their application to particular species. At some future period I hope to supplement it with one devoted more especially to the local names actually in use at the present day. I have introduced them here wherever an opportunity offered, but they demand much more attention than we are now able to give. The various names by which the same plant is known in different counties; the variations even of the same name which different counties present, may possibly be found to have some connection with original ethnological differences in the population of particular districts. I trust that there are yet some among the readers of Science-Gossip who have not communicated lists, who will be both able and willing to assist in the work.

In conclusion, I will quote a passage from the *Cornhill Magazine* for July, 1865, asking my readers to compare it with the one cited at the commencement of this paper, and leaving them to draw for themselves a conclusion as to which estimate of local names is the more correct:—"Science cannot, at present, afford to throw hard words at provincialisms. Too often, in her nomenclature, has she failed to interpret Nature; too often only given us the skeleton leaf instead of the flower. A long list of provincialisms might be given, where by a word a whole train of associations is aroused, and the close relationship of all things shown..... Many of our most expressive terms are fast dying out .....As schools are built, and schoolmasters increase, so will the old-world words perish in the struggle with the new." Let us, then, before they have perished altogether, endeavour to preserve as many of them as possible; and, while fully appreciating the advantages and privileges which the "march of intellect" brings in its train, let us regard with a feeling of reverence, if not of admiration, the relics which yet remain to us of the people departed and of the days gone by.

James Britten.

IANTHINA.

(*The Violet Sea-Snail.*)

Of all the Oceanides, daughters of Oceanus and Tethys, none was fairer than *Ianthe*, the beloved of the Grecian mariners of old. When Æolus let loose his wild winds to hold their mad revels on the high seas, the storm-tossed sailors sacrificed a black bull and prayed to this sea-nymph with the azure tresses to quell the riot; and when the bosom of the blue Ægean lay all unruffled, and favouring airs wafted their galleys smoothly past the vineclad isles, they gave her a milk-white lamb as their thank-offering.

A fairy fragile turbinated shell of deepest violet is Ianthe's ocean chariot, in which she rides gaily on the summer seas, where palm-trees wave over coral islands, where *Argonauta* swims, and *Physalia* flashes iridescent in the sun, and the air is fragrant with orange-blossoms. But no mere fair-weather sailor is the sea-god's daughter; she braves the broadest waters of old Neptune's vast domain; travelling on the Gulf Stream to visit the shores of green Erin; the Cornish fishermen meet her amongst the pilchards off the rugged cliffs of the Land's End; and half-stifled townsmen rushing from the stuffy closeness of busy cities to draw the breath of life fresh by the pure free fountain's brim, behold her dancing on the ripple in Swansea and Whitesand Bay.

A charming object is this blue pelagic shell, and worthy of much admiring study is its curious inhabitant. The bibliography of the *Ianthinidæ* is extensive, and readers must be sorely puzzled by the contradictory statements and dissimilar plates of different works: how many writers, how few observers. "A Phytophagous Tracheliopod," says one; "Exclusively carnivorous," says another; "Passes the greater part of its life at the bottom," writes a third; "Is wholly without the power of sinking," positively declares a fourth (fig. 17).

This is *Ianthina communis*, as seen floating at the surface, drawn from a living specimen, one of many taken in the South Atlantic.

Where in all the long catalogue of families are we to place this snail-like gasteropodous mollusc? Her "settlement" seems to be as puzzling as the parish rights of the destitute vagrant stranded at Aberdeen, whose father was an Irish American, and whose mother was a Welsh convict of Van Diemen's

Land, while he himself was born on board a Dutch brig in the Straits of Gibraltar.

Dr. Gray interposed the *Ianthinidæ* between the *Apple-snails* and the *Heteropods;* others affiliate them to the *Neritæ;* while Mr. Woodward consigns them to the *Haliotidæ*. They appear (by their anatomy) to constitute a distinct family, whose nearest affinities are with *Solarium*? and *Scalaria*, the lingual dentition offering a close resemblance, though the proboscis is very much longer in these than in *Ianthina;* oddly enough, as indicative of the probability of the relationship here alluded to, *Scalaria* secretes a purple fluid closely resembling, if not absolutely identical with, that produced by *Ianthina*.

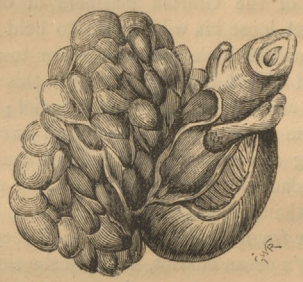


Fig. 17. *Ianthina communis*, nat. size.

The foot is the organ upon which I purpose to dilate as far as the limits of "Gossip" will permit, and as it is a certainty that amongst its many readers there are some who are not fully conversant with the *ideal archetype* of the mollusca, I think I may venture upon an elementary definition of the parts of the foot for their benefit.

The molluscan foot consists of four distinct portions, though some authorities omit the fourth, erroneously regarding it as a part of the body.

1. The *Propodium*, or fore-foot, which, in this our pelagic example, forms a boat-like expansion which helps to float the mass.

2 The *Mesopodium*, or middle foot, which constitutes the creeping surface in the common snail.

3. The *Metapodium*, posterior or hinder foot, the upper surface of which, when protruded, may be called the heel, and is known as the operculigerous lobe, from its bearing the operculum when present.

4. The *Epipodium*,—literally, on or upon the foot,—spoken of as a single part in an *ideal* foot only, but consisting of two lobes or processes in reality. The term *epipodia*, in the plural, freely rendered *lateral feet*, would perhaps be a better term; but adhering to the current word in the singular, I may define it as lying immediately above the three preceding constituents, and between them and the *meso-soma*, or floor of the body. In some genera it scarcely presents a distinguishable division, while in others its boundary is marked by a collar or ridge; in others it displays an overhanging mantle-like fold, and in others is developed into swimming-organs, as in the *Pteropods*.

The *Float* of Ianthina is somewhat inaccurately styled "an apparatus of locomotion," and is no less incorrectly spoken of as "a nidamental contrivance," and as "developed only in the breeding season, and thrown off as soon as the ova are deposited." The simple term *float* in its common acceptation conveys the most correct expression of its nature and uses. It is present even when Ianthe is in her babyhood, and is not by any means "a modified operculum." In the first place, an operculum, when present, is invariably borne on the back or upper surface of the heel, and not on its under side; whereas our sea-nymph's raft is attached to the under surface or sole of the metapodium: in the embryonic stage she is furnished with a rudimentary operculum on the back of her heel, which becomes arrested in development, and is ultimately thrown off, leaving no trace in the adult.

That the float is not of necessity the homologue of the operculum, we have proof positive in the *Macgillivrayia*, in which the two are co-existent; neither is the float a mere egg-raft, for it is possessed by creatures that never attach their ova thereto, but deposit them elsewhere. Nor does our heroine propel herself by "a lateral expansion of the mantle," but by means of her largely developed epipodia before mentioned.

The underside of the metapodium is composed of transverse rugæ, in the recesses of which are imbedded the secreting follicles which produce the plastic fluid of which the vesicular float is constructed, presenting us perhaps with an analogue of the byssus-making foot of the mussel tribe.

The manufacturing process may be readily comprehended by glancing at the following drawings, which are copied from originals taken from nature by Dr. J. D. Mc Donald, R.N., F.R.S., and placed by him at my disposal. The species here represented is *Ianthina exigua* (fig. 18).



Fig. 18. Foot × 12.

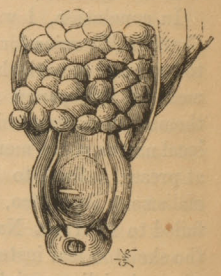


Fig. 19. × 12.

Here we see the spatulate fore-foot of the creature floating at the surface of the water, expanded to catch a globule of air (fig. 19).

Here we have the propodium closing over a

globule of air, which it is in the act of carrying down as a bubble below the surface of the water (fig. 20).

And this shows us the flexible propodium bent over—as the arm might be bent at the elbow to bring the hand to the shoulder—in the final act of depositing the new vesicle at the basal extremity of the float. It is probably at this moment that the air-bubble receives the albuminous or mucous film from the glands of the metapodium, with which it is found to be invested immediately the propodium is removed and again extended; but as the coating operation takes place actually within the enfolding foot, it cannot possibly be observed (fig. 21).



Fig. 21. *Ianthina exigua*, nat. size.



Fig. 20. × 12.

And here is *Ianthina exigua* with the float complete, with egg-sacs attached to its sides.

The primary use of the float I have no doubt is to enable the creature to maintain itself at the surface of the water without active effort; but it can and does remain at the surface when deprived of it, instantly setting to work, however, even under the observer's eye, to repair damages in the manner above shown. When the animal retires within its shell, a large portion of the float is drawn in, completely closing the opening, and is thus analogous, though not homologous, with an operculum. In cases of sudden fright, the float is sometimes nipped off by the violent retractation of the body within the test; some marine animals—*Harpa*, for instance—even throw off a portion of the foot itself under similar circumstances.

The habitat of *Ianthina* is the deep open sea, where she is found all through the day and night, floating at the surface; and though probably furnished by nature with the means of sinking and rising independently, she rarely appears to use them.

The float, which has no vital union with the animal, fulfils the secondary purpose of a safe anchorage for the marsupial sacs which contain the ova and protect the young. It is almost needless to remark that the pouches are not formed by the foot, but are prepared in the nidamental gland, like the egg-sacs of other marine molluscs (fig. 22).

This figure, drawn from a living specimen, displays one of the semi-transparent ovigerous sacculi attached by a pedicle to the vesicular float, and needs no explanation.

The eyes of *Ianthina* are not visible externally, but are altogether beneath the integuments and in immediate contact with the supra-œsophageal ganglion. The mouth is retractile from the apex, rolling in like the tentacle of a snail; it contains two

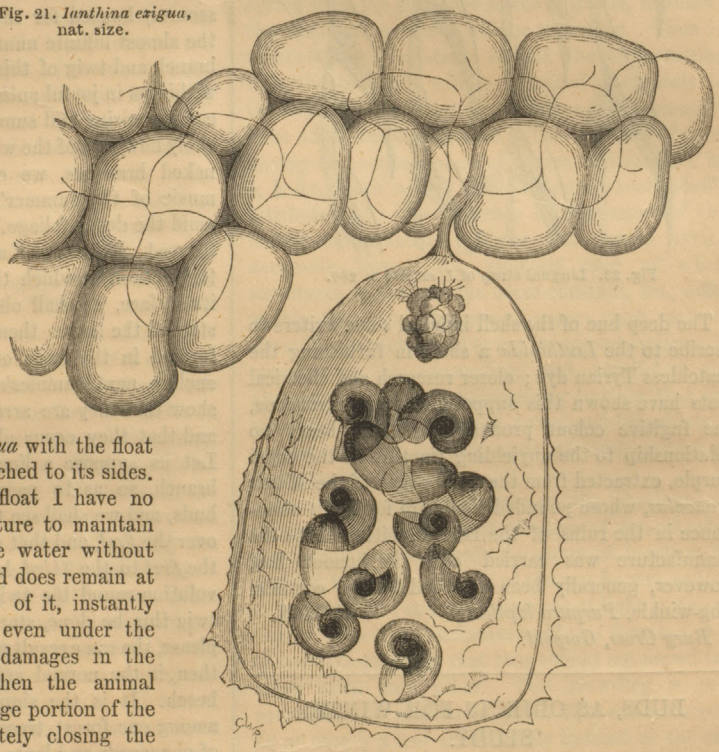


Fig. 22. Portion of vesicular float with a marsupial pouch attached, containing young of *Ianthina exigua* × 230.

brownish horny plates supported on a single pavement of cartilage-cells, which seem to be intended to afford a resisting surface to the teeth, an arrangement apparently confined to this isolated genus (fig. 23).

The tongue is broad, and divided into two lateral portions beset with simple uncinæ in a pavimental form without a median series, the individual teeth

seem to be connected with one another in longitudinal series by muscular bands, by the action of which a flickering independent motion of these organs is produced, which is visible when the mouth is open; the muscular apparatus by which this is effected is very similar to that by which the barbs of feathers are erected. The teeth are decidedly carnivorous, and in a certain limited sense prehensile; the gelatinous *Velella* is said to be a favourite prey.

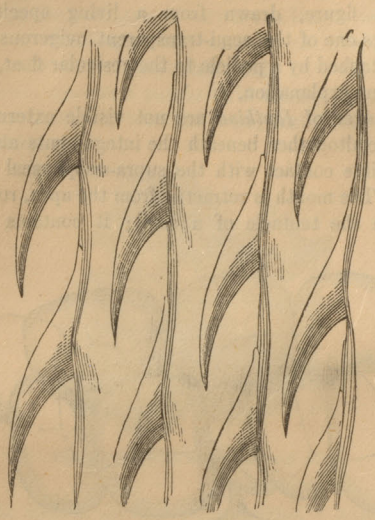


Fig. 23. Lingual strap of *I. exigua* × 280.

The deep hue of the shell induced some writers to ascribe to the *Ianthinidæ* a share in furnishing the matchless Tyrian dye; closer research and chemical tests have shown this supposition to be erroneous, the fugitive colour produced by them bears no relationship to the unyielding tincture of the royal purple, extracted from the renal organ of the *Murex trunculus*, whose pounded shells are found in abundance in the ruins of the Eastern cities where the manufacture was carried on; the honour has, however, generally been awarded to the common dog-winkle, *Purpura lapillus*. J. Y. H.

Bury Cross, Gosport.

BUDS, AS OBJECTS FOR WINTER STUDY.

WHEN admiring (as who does not?) the dense and highly ornamental foliage of our forest trees, one stays not to inquire minutely into the disposition of its component parts; the mind rests, gratefully satisfied, in contemplation of the graceful symmetry and perfect beauty of the whole. Yet it is with trees as with some grand artistic composition: the beauty of the whole results from the harmonious disposition of the minuter parts. And just as the thousand little touches that give harmony and beauty to a picture are perceived and understood only by the well-versed student of art, so in regard to our forest trees, it is only the careful student of nature who recognizes the minutiæ productive of their noble beauty.

The very different ways in which leaves are inserted into their stems, together with their great variety in form and colour, must ever be ranked among the chief sources of the elegance and beauty of our trees. As the disposition of leaves may be studied now, by means of their buds and scars, with equal ease as in summer, we may profitably study the naked branches and dead twigs as we take our winter's walk in the woods or shady lanes.

Here at the edge of the wood is a fine beech (*Fagus sylvatica*); let us commence our studies upon him. Here is a twig covered with lanceolate, finely-pointed, reddish buds with closely imbricated scales. No rain will penetrate here. The leaves within are folded with marvellous skill, and are securely housed for the winter. As we gaze upon the almost infinite number of buds crowding every branch and twig of this giant tree, our heart swells within us in joyful anticipation of the glories of the coming spring and summer. Instead of the melancholy howlings of the wintry winds crashing through naked branches, we can almost hear the sweet music of the summer's breeze as it gently plays amid the dense foliage. Sweet promise of a glorious future! Breaking off a small branch, and observing the method in which the buds are arranged along its surface, we shall obtain the same result as if we studied the leaves themselves; for these buds were formed in the axils of the fallen leaves, and now enclose next summer's. A glance is sufficient to show that they are arranged in two opposite rows, and that they occur alternately on opposite sides. Let us suppose a line drawn spirally round the branch, so as to pass through three consecutive buds, and we shall see that the *third* bud is directly over the *first*, and that our spiral line, in going from the *first* to the *third*, has described a complete revolution round the twig. In whatever part of the twig this be done, starting from whatever bud we please, the same result will always be obtained. This, then, is the normal arrangement of leaves for the beech. It is the simplest plan, and is common among our forest trees, and the humbler denizens of our woods and lanes. This disposition of leaves is expressed by the fraction $\frac{1}{2}$ (see figs. 24, 25), which signifies that in *one complete circle* round the branch *two leaves* are arranged, separated from each other by half the circumference, thus making with each other an $\angle$ of 180°—*i.e.*, they are in two *opposite rows*. The elm, the hazel, the lime, the hornbeam, and others follow the same method of arrangement.

Here is a noble specimen of the White Beam (*Pyrus Aria*), an ardent lover of our chalk summits. Its yellowish-green leaves, with their lovely resplendent white silk linings, rendered it a con-

spicuous object during the spring and summer, as every breeze exposed their brilliant under-surfaces. Proceeding as before, we see in this case that the fourth bud is directly over the first, and our imaginary spiral drawn through them will make one revolution round the branch. It is evident that the leaves in this case are differently arranged from those of our former example. Their arrangement may be expressed by the fraction $\frac{1}{3}$ (see fig. 27), which shows that in *one complete circle* round the stem occur *three leaves*, separated from each other by $\frac{1}{3}$ the circumference, thus making with each other an angle of 120°—*i.e.*, they are situated in *three rows*. The alder (*Alnus glutinosa*) is another example of this arrangement.

The neighbouring hawthorn will furnish us with another example for study. Let us fix our attention on a given bud, and, running our eye along the branch, until we arrive at another bud in a direct line with the former, let us count the buds forming the series. *Five* is the number, the sixth being seated immediately in a line with the first. Let us now trace out a spiral passing through each bud, from the first to the sixth: it makes, we find, *two complete circles* round the branch. This arrangement of five leaves in two revolutions round the stem is expressed by the fraction $\frac{2}{5}$. This expression indicates that the leaves are separated from each other by $\frac{2}{5}$ the circumference, and make with each other an angle of 144°, and that the cycle of five leaves is completed in two revolutions. The oak, the chestnut, and others have a similar vernation. The leaves in all these cases are arranged in *five rows*.

In a species of willow we are furnished with yet another arrangement. Here we find the series to consist of *eight* buds seated along a spiral making *three* revolutions round the stem. The expression for this mode of disposition is $\frac{3}{8}$. It shows, in the same manner as before, that the leaves make with each other an angle of 135°, and that they are separated by $\frac{3}{8}$ the circumference. It is clear, therefore, that they are arranged in *eight rows*. Other plants will be found to have their leaves arranged in one or other of the plans expressed by the fractions $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{8}$, $\frac{5}{13}$, $\frac{8}{21}$, $\frac{13}{34}$, &c. I am now speaking exclusively of plants with non-whorled leaves. This series of fractions, then, may be looked upon as indicating the phyllotaxis of non-whorled plans—*i.e.*, the law regulating their disposition of leaves.

A singular relation is found to subsist between the different terms of this series. If we add together the respective numerators and denominators of any two *consecutive* terms, we thereby obtain the succeeding one. Thus $\frac{1}{2}$ and $\frac{1}{3}$, the first and second terms of the series, gives us $\frac{1+1}{2+3}=\frac{2}{5}$ the third term; if now we take the second term, $\frac{1}{3}$, and the third term, $\frac{2}{5}$, and treat them in a similar manner, we obtain $\frac{1+2}{3+5}=\frac{3}{8}$, the fourth term. Similarly $\frac{2+3}{5+8}=\frac{5}{13}$, $\frac{3+5}{8+13}=\frac{8}{21}$, $\frac{5+8}{13+21}=\frac{13}{34}$, &c. Again, obtaining the denominators by the method given, we may set down the numerators by inspection; for each successive *denominator* becomes the *numerator* of the next term but one succeeding. This will readily be seen by examining the series of fractions. The curious manner in which these numbers may be derived from each other not only renders the series of terms expressing the phyllotaxis of non-whorled plants easy of acquisition and retention, but, if forgotten, of reproduction. Like Bode's celebrated law of interplanetary distances, while indicating, with remarkable clearness and precision, a great group of important facts otherwise difficult of remembrance, it is altogether empirical, and could not be deduced in any other way than by multiplied observations.

The disposition of leaves confers upon trees much of their individuality as species. As branches spring from the self-same nodes as leaves, it follows that their arrangement will be the same. Thus in plants whose phyllotaxis is half, the twigs arising from the branches will be arranged alternately in the opposite rows, and the branches will necessarily have a flattened appearance. The branches of trees having the arrangement of leaves represented by $\frac{1}{3}$, $\frac{2}{5}$, &c., have a very different appearance, wholly attributable to this difference in disposition of the leaves and branches. Trees and shrubs having decussate leaves, the simplest case of whorl structures, as the ash, the horse-chestnut, &c., differ widely from the foregoing cases; each pair of secondary branches and twigs being perpendicularly opposite to the succeeding, and parallel to the alternate pair. It is unnecessary to state that the appearance of leaf-covered twigs and branchlets is greatly affected by the mode of arrangement of their leaves.

In addition to its influence on the physiognomy of trees, the disposition of leaves is of considerable physiological importance. As leaves are functionally devoted to the elaboration of the sap by respiration, exhalation, &c., and as free access of light is essential to the perfect performance of this function, it is of some consequence that they should not crowd too much upon each other. This crowding is prevented by the method in which they are arranged. In no case is a leaf immediately in front of the one preceding it. In those plants, like the elm, the hazel, the hornbeam, &c., and in whorl-leaved plants, which are most obnoxious to crowding, the leaves are separated by twice the interval between one leaf and another, for the third leaf is over the first, the fourth over the second, &c. In other cases they are more widely separated. Thus, in the next case the fourth is over the first, in the next the sixth, then the ninth, then the fourteenth, &c.

The phyllotaxis of plants with whorled leaves is more difficult and complex. It can only be reduced

to the ordinary phyllotaxis by a liberal suppression of leaves. It is an interesting and suggestive circumstance that the plants of the earlier geological formations had all whorled leaves, as is shown by the Rev. Samuel Haughton, in his "Manual of Geology." The introduction of non-whorled plants is geologically of a more recent date.

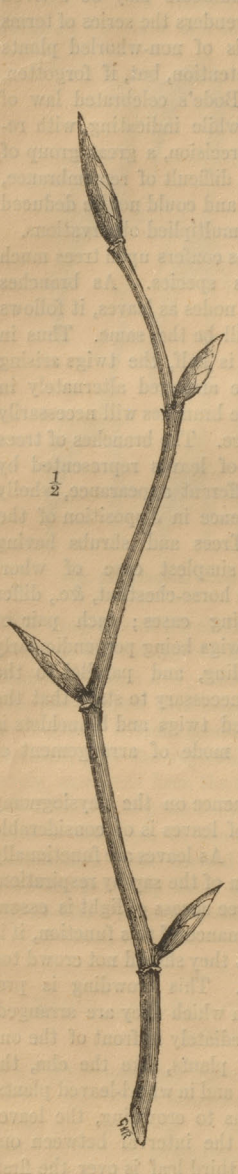


Fig. 24. Beech.



Fig. 25. Hornbeam.

The study of buds may also be turned to account in other ways. It is of great importance to be able to recognize our trees and shrubs in the winter season, when devoid of leaf, flower, and fruit. This may perhaps be done by observing the conformation of the branches and twigs, and the colour and sculpture of the bark. It will, however, be greatly facilitated by an intimate knowledge of buds. It is not unfrequently desirable to be able to assign small stray branches and twigs to their parent orms; and for this purpose a thorough knowledge

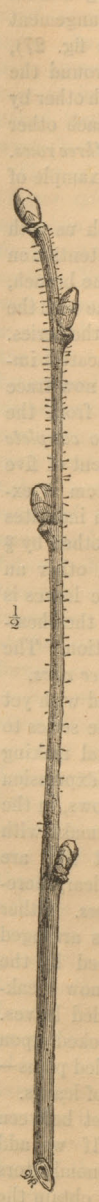


Fig. 26. Hazel.



Fig. 27. White Beam.



Fig. 28. Maple.

of the form, colour, and arrangement of buds, if not essential, is of very great value—a cursory inspection, in such case, being often all that is necessary in order to determine the question.

A few illustrations are given, with brief notices. They are intended rather as incentives to study than as valuable for their teaching.



Fig. 29. Oak.

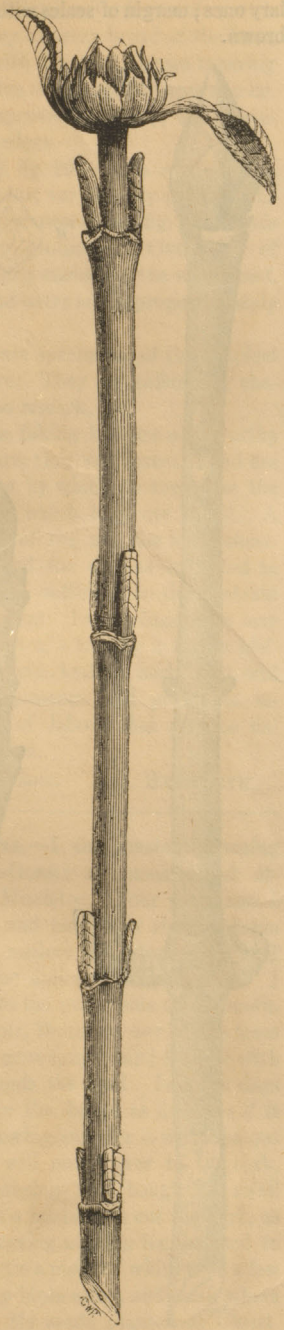


Fig. 30. Wayfaring Tree.

Beech (*Fagus sylvatica*), fig. 24.—The buds of this noble tree are highly characteristic. They are long, lanceolate, with acute apex, and are placed at a pretty constant angle of about 45° with the stem. They are covered with closely imbricated, shining, brown scales.

Hornbeam (*Carpinus betulus*), fig. 25.—This tree, whose leaves have a strong resemblance to those



Fig. 31. Grey Poplar.

Fig. 32. Lime.

of the beech both in form and manner of unfolding, has buds also not unlike those of the latter. They are, however, sufficiently separated from them by their erect manner of growth, being mostly closely pressed to the stem upon which they

grow, and by their more numerous and shorter scales.

Hazel (*Corylus avellana*), fig. 26.—This tree and the hornbeam are generally grown together in our Kentish woods for hop-poles, firewood, &c. Their leaves on first expanding are very similar, and may



Fig. 33. Wych Elm. *a*, leaf-scar.



Fig 34. Sycamore.

easily be confused. At this time the great difference in the colour of their stipules is sufficient to separate them at a glance: those of the hornbeam are quite red. Their buds are widely different, both in form and colour; so that the trees are more easily separated in winter than summer. The buds are obovate, laterally compressed, particularly the axillary ones; margin of scales with fine streak of reddish brown.

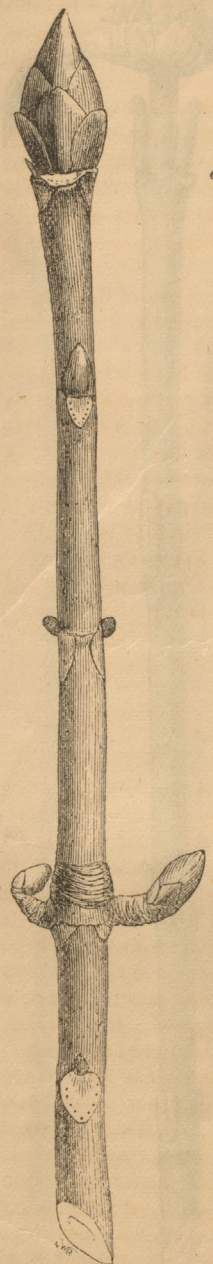


Fig. 35. Horse Chestnut.



Fig. 36. Ash.

Wych Elm (*Ulmus montanus*), fig. 33.—The buds of this tree are broadly ovate or elliptical, dark, and shining.

White Beam (*Pyrus aria*), fig. 27.—These buds, in addition to the difference of arrangement, are very dissimilar to any of the foregoing. They are of an obscure green colour, with few scales, with reddish margins. They are very broad at the base, or point of insertion with the stem, thence tapering to a point, having thus a triangular appearance. They are slightly compressed laterally, and somewhat carinated at the edges.

Oak (*Quercus robur*), fig. 29.—Buds small, ovoid, reddish; scales numerous, very closely imbricated.

Grey Poplar (*Populus canescens*), fig. 31.—Buds reddish, shining, very glutinous. Outer pair of scales enclosing, or nearly enclosing, the whole bud. Terminal bud large, and outer scales proportionately less.

Figs. 30, 34, 35, 36 are specimens of the simplest case of whorl-structure. They are sufficiently characteristic, and need no remark.

The *scars* left by the falling leaf are also worthy of some study. In form they vary greatly, and are frequently good marks by which to recognize the branch or twig upon which they are found. A reference to the scars of the ash, the horse-chestnut, the grey poplar, and the elm, as indicated in the foregoing figures is sufficient to demonstrate the truth of this statement. In conclusion, we may add that there is no part of a tree, be it leaf or leaf-scar, stem, branch, or root, bud or bark, that will not amply repay in pleasure and profitable instruction any amount of labour that may be expended in its examination.

St. Mary's Vale, Chatham. J. Hepworth.

Mistletoe Culture.—I am constantly seeing accounts in Science-Gossip of unsuccessful attempts to grow the Mistletoe. Four years ago I planted some berries, and have now about a dozen nice plants. If your readers will adopt my plan, I think they will have no difficulty in growing it. I squeeze the berry on to the under side of a smooth-skinned bough of apple, thorn, or any of the trees on which it generally grows, and bind it there with the mucus that surrounds the seed. In a few days the seed will adhere to the bough as firmly as if it were glued. The following summer it will send out a small shoot, which will curve over to the bark, and press into it, causing the bough to swell slightly. I think it is a mistake to cut the bark, as it causes it to open, leaving nothing for the seed to root into. I generally tie a piece of white tape a few inches from it, to keep birds away, and mark where the seed is planted. My seeds planted at Christmas, 1867, are all growing, and those planted this Christmas are now quite firm on the bough. If any of your readers wish further information on the subject, I shall be pleased to give it them.—*S. C. Hincks.*

THE SISKIN.

(*Fringilla spinus.*)

When November comes, like the pioneer of winter, to cut down the leaves, and scatter the seeds of the forest trees, then is the time to look for the Siskin. Follow the winding stream till the last homestead has been left far behind, and creep stealthily to the nearest alder or birch. The seeds of these two trees form the favourite food of the Siskin, and it is here you may expect to find him, if he happens to be in your neighbourhood. If the season be a favourable one, and there be abundance of seeds, the greater your chance of success.

The Siskin comes to us as a winter visitor from the north, but the date of his arrival is very uncertain, apparently depending as much upon a sudden change of temperature, as upon an abundance or scarcity of his favourite food. The elm and maple supply him in turn with a change of diet, and in the pine and larch plantations he is almost sure to be found at the proper season, although from the evergreen nature of the two last-named trees, and the denser growth of their foliage, he is not so readily seen there.

Our own acquaintance with the Siskin was made where the alder and elm best flourish and the larch and pine are scarce. It is therefore upon an alder-tree that we shall introduce the bird to our readers.

In size no larger than a Linnet, but with shorter wings and tail, the male bird may be at once distinguished by his black cap and chin, his greenish-yellow breast and rump, spotted flanks, and black and yellow wings. The tail is forked, and with a brownish-black tip. The female, more sombre in appearance, yet sufficiently like her mate to be recognized, is of a general greenish-grey above, suffused with longitudinal streaks of brownish-black, and the dark streaks, which are conspicuous on the flanks of the male, extend further in the female, to the sides and the whole of the breast. She has no black on the head or chin, but shows the greenish-yellow rump which characterizes the other sex. We have remarked that in young males the black colour is confined to the head, and does not appear on the chin until they are fully mature.

The variety of attitudes which the Siskin assumes in his busy search for seeds, is very striking, and reminds us a good deal of the Tit family. We have often seen the Siskin and the Marsh Tit on the same branch vieing with each other in their acrobatic feats, and have been struck with the similarity of their movements; now clinging to a catkin which sways with the weight; now hanging head downwards, the more easily to extract a seed or lurking insect; anon, swinging by one foot upon a bending

spray preparatory to a new flight, or descending jerkily to some tall reed or thistle-head only to return to the favourite tree. A prettier sight than a little flock of Siskins thus engaged, can scarcely be imagined, and while the eye is pleased with their ever-varying attitudes, the ear is charmed with their incessant merry notes; for they are by no means silent at their work. A pleasing twitter, uttered, as it were, half aloud, serves as much to keep the flock together, as to express the high spirits of the individuals which compose it.

A great friend of the Siskin is the Lesser Redpole, and the two species are frequently to be seen in company, but we must confine our attention for the present to the former bird. Although as a general rule remaining with us only from November to April, there are many instances on record of the Siskin having remained to nest in England, and we are satisfied that in some parts of Scotland, this bird breeds regularly every year. Mr. A. G. More, who has been at considerable pains to ascertain the distribution of birds in Great Britain during the nesting season, says of the Siskin:* "The nest has been found in Lancashire (*Yarrell*); near Walton Hall (*Waterton*); in Durham (*Hancock and Rev. H. B. Tristram*); and in Westmoreland (*Bolton quoted by Montagu*). In the South of Scotland, the Siskin breeds occasionally in Dalswinton Woods, Dumfriesshire (*Gibson*); in Kirkcudbright (*Yarrell*); within two miles of Glasgow (*R. Gray*); in Perthshire perhaps regularly; in Argyleshire; and, though not numerous as a species, may be considered to nest regularly in most of the northern counties of Scotland." In Ireland the Siskin has only been noticed as an occasional winter visitant.*

The nest and eggs resemble those of the Goldfinch upon a smaller scale, and some authors, taking into consideration the structural similarity of these two birds have separated them from the true *Fringillidæ* and placed them in a genus by themselves under the generic name *Carduelis*.

Meyer has found the nest of the Siskin so near London as Coombe Wood, Wimbledon Common; and as the eggs taken were afterwards hatched under a canary, there was no doubt about the identity of the species.

In the third volume of his "Illustrations of British Birds and their Eggs" (p. 97) the above-named author gives an interesting account of two other nests of the Siskin which he found,—the one at St. Anne's Hill, Chertsey, and the other "in a wild straggling hedge in the open plain bordering the Thames, at no great distance." In both cases the parent bird was distinctly seen upon the nest.

To this account, and to some remarks by that excellent observer Charles St. John (which may be found in his "Nat. Hist. and Sport in Moray," p. 110), we refer such of our readers as seek further information than we have given.

To those who know the Siskin only as a cage-bird, we say, study him in his proper haunts; steal quietly to the alder, pine, or birch tree; watch his merry antics, and listen to his sprightly song; and we venture to say that the pleasure to be thus derived will far outweigh any that can arise from the contemplation of a solitary captive. J. E. Harting.

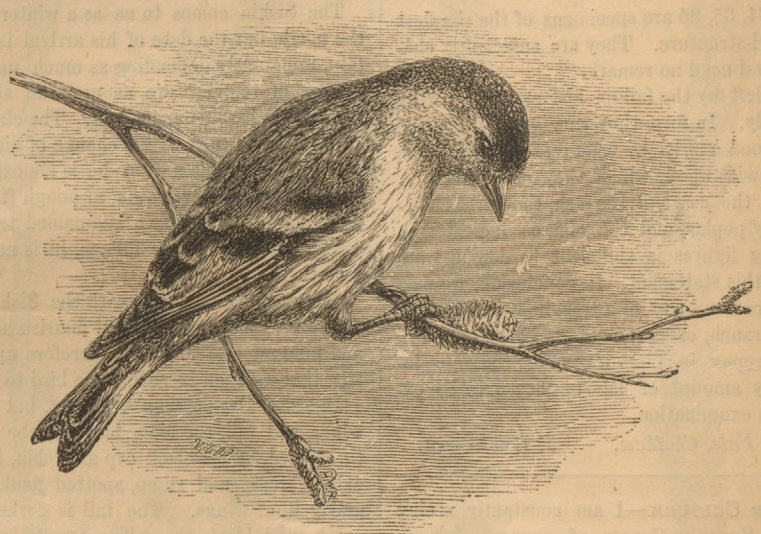


Fig. 37. The Siskin.

* *The Ibis* for 1865, p. 129.

* Thompson's "Nat. Hist. of Ireland," vol. i. p. 264.

GUDGEON SCALE.

We give a magnified figure of the scale of the Gudgeon (*Gobio fluviatilis*) because it is one of the "common objects" which is not so well known to microscopists as it ought to be. There is a great similarity in the structure of this scale and that of the Perch, but the differences are quite sufficient to make both of them equally desirable for the cabinet. The scales are small and beautifully transparent, so that they can scarcely be surpassed, even by the scale of the "Sole" as objects for the polariscope. The magnifying power under which the woodcut is drawn is slightly higher than that of the scales figured at page 13.

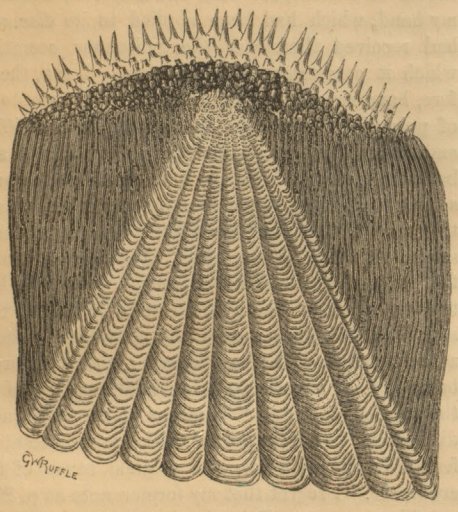


Fig. 38. Scale of Gudgeon × 12.

THE WINTER HOME OF THE HUMBLE BEE.

It is a very pleasant thing for a lover of nature resident in the country to have a friend with tastes somewhat similar to his own, to join him in his evening walks, and with him to explore favourite haunts in search of some of the treasures of natural history.

One evening, late in the month of August, in company with such a friend, I enjoyed the pleasure of an agreeable search in a very pleasant and extensive demesne. My special object was to obtain beetles, as I was then engaged in the examination of the gastric teeth of some of the Coleoptera. While searching in a sheltered grove that bordered upon a meadow, we happened to turn up a large stone that was slightly embedded in the earth, and, from its position and appearance, had evidently lain a long time without any disturbance of place. We found that the under-surface of the stone was quite flat, and that it lay upon a smooth bed of clay, to which it fitted very closely. Near the centre of this bed, and about eight inches from its nearest margin, there was a spot, nicely hollowed out, of rather more than an inch in length; the width and depth were each about three-fourths of an inch. In this hollow bed there was a humble bee. The bee was lying on its side, and was alive, but not very active (fig. 39). The flat bottom of the stone had formed a close covering for the cell, and we could not discern any marks of the passage by which the bee had found access to its place, nor could we see any traces of the earth that had been removed by the bee when forming the cell. The shelter and protection of the spot were very complete. We concluded that we had happened upon the winter quarters of a female bee, where the period of her comparative torpidity would have been passed until the return of the warm days of the following spring; and from her position in her winter home, we recognized an applicability in the specific name of the bee as the *Bombus terrestris*.

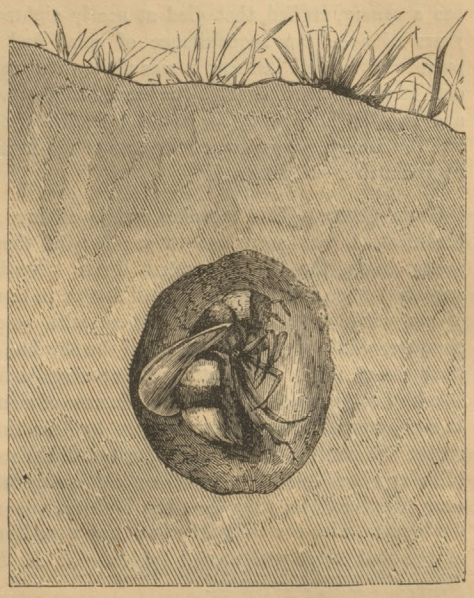


Fig. 39. Humble Bee at home.

Armagh. Lewis G. Mills, LL.B.

Microscopic Objects — February. — Water-fleas and the Green Hydra may be found in pools and ditches. The pollen of *Tussilago fragrans*, very pretty. That of *Corylus avellana* exhibit the pollen tubes when treated with weak sulphuric acid. Hairs of *Senecio vulgaris*. The stellate and compound hairs of the ivy and the torulose hairs of *Lamium album*.—*H. G. G.*

ZOOLOGY.

Duration of Animal Life.—I was reading some short time since in a periodical, observations almost assertions, relative to the above subject, wherein the writer gave the maximum length of life to birds as ten years. This, from actual experience, I know to be a great mistake. I had a pigeon for twelve years, and he was two years old when I bought him, and thus he was fourteen years old at the time I lost him, and then he was apparently as active as ever he was. A relative of mine has a canary, stuffed, that died at nearly eighteen years of age. An acquaintance of mine had a parrot that when I last saw it was ninety-five years old. It was an heirloom from one branch to another, and may be alive now, for aught I know. Poll, like the canary, gave strong evidences of age in her ragged attire.—*G. Bullard.*

Gold Crest.—This morning, while sitting at breakfast, I was surprised to see two of those pretty birds, the Golden-crested Wren (*Regulus cristatus*) come and pitch on a small fir-tree in front of my window, and I watched them with much pleasure, whilst they busily searched the shrubs for their insect food. Is it not a rare occurrence for this bird to approach so near to the haunts of man? It may interest some of your readers to hear that on the 7th of last month I saw a flock of Fieldfares (*Turdus pilaris*), or Redwings (*Turdus iliacus*), pass over this locality; they flew too high for me to distinguish with certainty whether they were birds of the first or second named species.—*J. R. E., Downshire Hill, Hampstead.*

New Entomostraca in a Coal-mine.—Mr. Thomas Atthey has discovered a new and interesting species of Entomostraca on the roof of the Low Main, West Cramlington Colliery, near Newcastle. Under the name of *Canthocamptus cryptorum* it is described by G. S. Brady in the *Quarterly Journal of Microscopical Science* for January.

New British Moth.—At the meeting of the Entomological Society of London (December 7th), Mr. Edward Saunders exhibited a new British Moth (*Crambus myellus*), allied to *C. pinetellus*, captured near Aberdeen by Mr. D. E. Brown.—*Gardeners' Chronicle.*

Orange Fly (*Ceratites citriperda*) has been found at Peckham in Marie-Louise Pears; and no wonder that it has settled in England, seeing how many "maggoty" oranges have come over of late. Lovers of good pears will not be glad to hear that in the absence of oranges this fly accommodates itself with pears. It may in the course of a few years prove to be a real pest.—See Newman's "Entomologist" for January, with figure of the fly.

On Physalia.—With regard to the remarks of Mr. Gosse, F.R.S., on my note in Science-Gossip for December, on the Physalia, I would observe that I did not imagine that Mr. Gosse doubted the discharge of a fluid, but that he doubted that the stinging sensation was caused by the fluid *alone*. I was inclined to think that he was uncertain as to this point from his remarks quoted in my note; and I felt that my face had borne testimony to very "sensible observation" when smarting from the effects of contact, *not* with the Physalia, but with my hand, which had been applied to its disc, and had received therefrom the poisonous secretion which it communicated to my face. I can, therefore, have no doubt, after this, that the symptoms of poisoning are due to an irritant juice *emitted*, and that it does not require the penetration of any barbs to make its influence felt. Mr. Gosse would appear to imagine that I brought up my experience to prove that contact with the Physalia produces severe irritation of the skin. Such a well-known fact required no further testimony. What I wished to show was, that there is an acrid juice emitted, and that this juice causes the irritation without actual contact with the Physalia; and therefore I hold that my experience is an additional proof of the pain being caused "by means of an acrid juice discharged" from the animal, which latter quotation from Mr. Bennett was the original cause of the argument. I regret that my former note at p. 279, vol. iii., was not sufficiently clear to prevent a misunderstanding. I had no intention of attempting to prove Mr. Gosse's doubts, but to add an "iota" of evidence towards the support of Mr. Bennett's statement, which latter I think I have done, notwithstanding that Mr. Gosse is of a different opinion. Unhappily, I do not possess Mr. Gosse's valuable work on "Sea-Anemones," so I may be ignorant of a similar circumstance having occurred under that gentleman's own observation.—*W. Wykeham Perry, H.M.S. "Caledonia," Malta*, Dec. 22, 1868.

Trichina spiralis.—Dr. Virchow's treatise on the life of Trichina, translated by Dr. R. K. Browne, is appearing in consecutive numbers of the American "Dental Register."

Queen of Spain Fritillary (*Argynnis lathonia*).—A beautiful specimen of this rare insect was caught by myself in a field at Milton next Gravesend, the latter part of September last.—*H. J. M. Todd, Gravesend.*

Protection of Sea-birds, &c.—A meeting has recently been held at the Zoological Society of London, in which the Rev. H. B. Tristram, Professor Newton, and others, took part, to carry out the views propounded at the British Association meeting, and to place themselves in correspondence with the Yorkshire Society (see p. 10).

BOTANY.

The Glastonbury Thorn.—There is, in Wycombe Park, a tree of this variety, known as *Cratægus oxyacantha præcox*, which usually buds, but does not blossom, in December. This season, however, many blossoms have fully expanded, induced by the mildness of the weather to put in an appearance; their perfume being quite as powerful as that of those which expand at the more usual time. —*Quart. Mag. of High Wycombe Nat. Hist. Society.*

The Wood Sorrel (p. 20).—Mr. Holland intended to draw attention to the fact that *Oxalis Acetosella* produces seed from "apetalous flowers;" not from "a petalous flower," as your printer has made it appear. Mr. Watson, in his "Compendium of the Cybele," notes "summer flowers apetalous, as in *Viola*."—*B.*

Wood Sorrel.—Mr. Holland will find a notice of the manner in which this pretty wild plant produces its seed, in Barton & Castle's "Flora Medica."—*Helen E. Watney.*

Cholera Fungus.—After a series of long botanical researches, Professor Ernest Hallier, of the University of Jena, has convinced himself of the presence in the excreta of cholera patients of a microscopic fungus which exists in them in considerable quantities. On submitting this minute plant to a careful microscopical examination, the distinguished botanist found that it has all the characters of *Urocistus oryzæ*, which in India is found sometimes in the rice plantations. Professor Hallier then manured some rice plants with the excreta in question, and finds that they perish rapidly. A whole plantation may be thus destroyed by the *Urocistus* in a very short space of time.—*Scientific Review.*

[Our contemporary, like Professor Hallier, has leaped to an unjustifiable conclusion. The researches alluded to have assumed too much, and proved too little. Scientific men do not believe in them, and many months since we gave our grounds for rejecting wholly the supposed fungoid origin of cholera, in "Country Life."—*See* also Dr. Thudicum's remarks in the first Number of the *Monthly Microscopical Journal*.—Ed. S. G.]

Scurvy Grass.—This plant (*Cochlearia officinalis*) is rare on the southern coast, at least I have never found it there; in the north, it is said to be plentiful on the shores of creeks, and frequent on the highlands of Wales and Scotland. Will any one who has an opportunity of observing it give some information as to its habits of growth? The authorities differ. It was once cultivated, and Miller, in his "Gardener's Dictionary," says it is an annual, because, when sown in July, the proper season, it completes its growth by July following; a reason not quite satisfactory. Loudon, another gardener, describes it as biennial. Withering, the same. Hooker, in his "British Flora," 4th edit., 1838, marks it annual, in common with all the sister plants except *C. armoracia*. Rhind, in his "Vegetable Kingdom," says it is perennial. My experience is limited to one specimen of *C. officinalis* found, with others, on a dry bank (to which the plant seems confined in that neighbourhood), near the town of Weston-super-Mare, Somerset, and removed in September to a garden in another county, where it flowered strongly two years, and had a perennial character, throwing up several flowering stems. It perished in the drought of last summer. I am led to think that Rhind is right. It is bold to challenge the authority of such a book as Hooker's "British Flora," but itself furnishes strong evidence that an error has crept into it. The species named *Greenlandica*, which Hooker suspects to be only a variety of *C. officinalis*, and which Miller, under the name of Welsh Scorpion grass, describes as biennial, is marked annual in the "British Flora;" but it is highly improbable that an annual plant should be able to maintain itself on the edge of the Arctic Circle, among the dwarf willow and birch, as its name implies, and it is known to do. The plant is interesting, but fallen into general disuse, both as a salad and a medicine; though Loudon says it forms, mixed with orange-juice, an ingredient in the popular remedy called "Spring Waters." *C. armoracia*, the horse-radish, a sister-plant, does not seem at all likely to be so much neglected.—*S. S.*

Monograph of Thuja.—I ask permission to correct a typographical error in my recently published *Monograph of the Coniferous Genus* Thuja (*Linn.*), *and of the North American species of the genus* Lebocedrus (*Endl.*) (Transactions of the Botanical Society of Edinburgh, vol. ix. pp. 358-378). The parallel columns containing the characters of the genera on p. 363 ought to be transposed, and the superfluous "the," last word 15th line from the foot of p. 362, deleted. The error was made after the paper passed from my hands; and though I have corrected it in a number of separate copies, and the context and preceding and succeeding statements make it at once self-evident, yet the memoir may pass into the hands of some who have not seen these corrections.—*Robert Brown.*

Flowering of Whin in December.—When strolling along the southern slope of the Ochil Hills, near the village of Blairlogie, on Christmas morn, I was much surprised and pleased to find the topmost sprigs of the whin clustered with its yellow flowers. The stony slopes of the hill reflect the sun, while the mountains shelter from the N. and E. wind, so that, on a fine day in December, you have the temperature of April.—*Wm. Haddon.*

MICROSCOPY.

Christmas and the Microscope.—

Nec jam sustineant onus,
Sylvæ laborantes, geluque
Flumina constiterint acuto,

might well be said of Canadian woods and streams at this season of the year. The earth has put on her winter robes, and under them she hides most of those objects which in summer please and delight us so much. A cheerless prospect for microscopists, one would think. So I thought, as on Christmas afternoon I sallied out with bottles and stick in search of diatoms, infusoria, snow-peas, &c., though I did not expect to be very successful. After wandering about for some time, searching vainly for an unfrozen stream, I was about to return home with empty bottles, when I suddenly bethought myself of an old spring which supplied several families with water, and which I knew therefore would be unfrozen. In this country, wherever there is a good spring some kind individual sinks a barrel for the benefit of the community at large, and thereby benefits microscopists in no small degree, for in these you are generally sure to find a good supply of microscopic objects. When I got to the spring the first thing that greeted my sight was a piece of algæ floating on the top of the water, and on a closer examination of the barrel I saw that the sides had a dark-brown coating, in which I knew diatoms and infusoria would be found. Scraping some of this off, I placed it in a bottle and retraced my steps homeward, well satisfied with my afternoon's walk. Getting home at that unfavourable time for working, just as the light is beginning to fail, I had to exercise my patience and wait till evening to see what my bottle contained. I had not long to wait, as darkness soon succeeds the light here: so when I had got a lamp lighted, I proceeded to examine my spoils. A short account of the things I found may not be uninteresting to English readers of the Science-Gossip, as it will give them some idea of what lovers of science meet with in this country. Upon putting a slide under the microscope before I had it properly focussed, I saw the dim outline of some little creature kicking and struggling as though it were caught in a net. It turned out to be one of the Tardigrada, or little water-bears, that had got its feet entangled in the gelatinous tube of the *Encyonema prostratum*. It was with great difficulty that it freed itself from the jelly, and then it began its slow and stately walk, which formed such a contrast with the quick, lively movements of the animalcules with which it was surrounded. The little water-bears are by no means common objects with us, but it only makes them the more acceptable when we chance to get them. The *Encyonema prostratum* seems to delight in these quiet water-barrels, though it is occasionally found on the wave-washed Cladophora of our lakes. They always remind me of the manner in which peccaries sleep, packed closely together in hollow logs. I have seen the *Encyonema* shoot out of its tube, but whether it can find its way back again or not I do not know. Two species of *Euglenæ* were very plentiful, viz., the *E. viridis* and *E. acus*. They are found here in the spring in such numbers as to give to the water they are in a dark green colour. The *Paramecium aurelia* and *Kolpoda cucullus* were in great abundance. Among other Infusoria were the *Amphileptus anser*, two species of *Vorticellinæ* and the *Leucophrys patula*. Of Desmids there were three species: *Closterium acerosum*, *Cosmarium undulatum*, and *Scenedesmus quadricauda*. Of Diatoms, besides the *Encyonema*, the following species were present: *Gomphonema coronatum*, *G. minutissimum*, *Melosira varians* (Thwaites), *Fragillaria rhabdosoma*, *Meridon vernale*, *Navicula amphirhynchus*, *N. librile*, *Hyalosira rectangula*, *Synedra splendens*, *Cymbella gastroides*, and some others.—*W. Osler, Dundas, Ontario.*

Object for Polariscope.—The skin and scales covering the legs of a pheasant make a very pretty object for the polariscope. The scales should be cleared from fat by immersion in ether or dilute liquor potassæ, dried between slips of glass, soaked in turpentine until quite transparent, and finally mounted in balsam. The colours are very bright if a selenite stage is used.—*J. H., Cheltenham.*

Cordylophora lacustris.—The only habitats I find recorded for this interesting zoophyte are docks in London and Dublin, where there would, I suppose, be some admixture of salt water sometimes, though Professor Allmann says he kept specimens for a fortnight in fresh water. Last June a specimen was found by a friend of mine on a piece of old canal-boat, which we were examining for polyzoa, lying on the Birmingham Canal at Tipton. I subsequently found this zoophyte in the Stourbridge Canal, close by the town; and I also obtained a luxurious gathering from a pool near Pensnett, Dudley, where it was lying close to the side, attached to a small stick, and exposed to the full glare of the August sun. I transferred this colony to my aquarium, where it is still (Nov. 16) flourishing. The zoophyte does not seem therefore to avoid light, though, I suppose, when so exposed, it is frequently destroyed by the more rapid growth of Confervæ. Johnston only gives a short account of it in his 2nd edition, and derives the name from κόρδυλος (a water-newt) instead of κορδύλη (*clava*, a club).—(*See* Professor Allmann's admirable paper in *Philosophical Transactions*, 1853.) An interesting account of it also, by the Rev. T. Hincks, is to be found in *Ann. and Mag. Nat. History*, 1853.—*W. Madeley, Pensnett, near Dudley.*

NOTES AND QUERIES.

Fumart.—The Pole-cat is called Fumart in Cumberland, which is evidently a corruption of Foul-marten, so called on account of the horrid stench it emits when attacked; and also to distinguish it from the Beech-marten, or Sweet-marten (*Mustela martes*), or, as it is generally called there, "Mart." The Stinkhorn fungus (*Phallus impudicus*) is known here by the name of Pow-cat, which is doubtless a corruption of Pole-cat. It is not uncommon to hear a person say, when speaking of anything causing a disagreeable odour, that it stinks like a Pow-cat. —*J. B.*

Similar replies have also been received from E. T. Scott, W. Tyrer, Fred. Smith, &c.

Fumart.—At p. 22, W. Gain makes inquiries about this word. The only light (if light it can be called) that I can throw on the subject is an extract from Thomson's "Etymons of English Words," 1826. He speaks of the "Jumart" as "an animal absurdly supposed to be produced from a male ass and a cow. F. (French) Jumart, from A. (Arabic) Hummar, a red ass, which is held in disrepute as degenerate." One is almost tempted to correct the word with the Latin "*Jumentum*, a beast of burden." Of course, such a monster as the Fumart or Jumart never existed.—*W. W. Spicer.*

Weather-wise Glowworm.—There is a weather proverb to the effect that,—

> "When the glowworm lights her lamp
> Then the air is always damp."

Can you inform me why this is the case? Sometimes on a warm night in summer, when walking in the neighbourhood of Lyme, I have seen glowworms in abundance, but on passing through the same place a few nights afterwards I have scarcely observed any. How far north is the insect found? and does it inhabit the Isle of Man and Ireland?—*F. J. D. Hinton.*

Snow-bunting.—Can any of your readers inform me where I can get a female snow-bunting. I have two males, and should be glad to exchange one of them for a female, or am willing to buy. I have had my birds two years, they are healthy and in good feather. I should like the female to have moulted in confinement.—*A. Pickard, Wolsingham, Darlington.*

Drying Leaves.—In drying leaves for a specimen-collection of "winter leaves," I find the leaves of the laurel (either common or variegated) become *invariably* spotted with black, which spreads until the whole leaf is discoloured, every precaution having been taken, such as changing the drying-papers. Can any of your correspondents explain this, or assist me with their experience?—*H. P.*

Lamperns.—"L. S." would be glad to know if the little fish caught in the Severn and sold by the name of Lampern, or Lampron, is *Petromyzon fluviatilis*, and whether it is the same fish that Henry I. is said to have died from indulging in? She would be glad to know if Lamprey is its proper name, or whether the country name of Lampern or Lampron is right. She has *heard* that the lamprey is a much larger fish.

What's in a Name?—The remarks made by "M.G." in Science-Gossip last month remind me of an amusing incident somewhat *à propos* of his little anecdote. A new gardener of mine said to me one morning, when I was giving him some directions respecting a few shrubs I wanted removed, "A couple of those 'our angels' would look beautiful there, if you please, ma'm."—"A couple of what?" I asked. "'Our angels,' ma'm. Those blue 'our angels,' like your mamma, Mrs. Raby, has at Beyn Mor," was the reply.—"'Our angels,'" I repeated. "Yes, ma'm; we have pink ones here: there is some over there," pointing, as he spoke, to a clump of hydrangeas.—"Why, those are hydrangeas, Jenkins," I exclaimed, nearly dying of laughter. "Well to be sure! Mrs. Raby called them by some foreign name, and I thought it was 'our angels.'"—*Helen E. Watney.*

Acorns.—It is a fact—no "folk lore" at all—that when pigs are killed without being put up to fatten on barley-meal, peas, &c., after feeding on acorns the flesh will not make good pork or bacon. I know this to be the case.—*Helen E. Watney.*

Humming-bird in England.—I must beg leave to dissent from your correspondent's inference with regard to its being the *Sphinx convolvuli* which was mistaken by the lady at Leamington for the Humming-bird, for I think everything points to the supposition that it was the Humming-bird Hawk-moth (*Macroglossa stellatarum*) which she saw. For instance, *S. convolvuli* is a nocturnal insect, and the probability is that no one would imagine it was a Humming-bird which was seen flying at night. *M. stellatarum* being diurnal in its habits, flying in the hottest sunshine over flowers, with that peculiar darting, hovering motion (which has earned for it its common name) when about to dive its long haustellum into the nectaries of petunias, pelargoniums, or other flowers, might well be mistaken by a person ignorant of natural history for the veritable Humming-bird. The description, too, tallies with *M. stellatarum*, inasmuch as the "plumage of reddish brown, speckled upon the back with white," is as the two bars of white upon the rufous ground-colour of the body would appear when the moth was poising itself over the flowers.—*A. M. B.*

Silurian Maps.—I believe there have been published some approximate geological maps of Europe at the Silurian period. Will you inform me where they are to be obtained, and the price of them? Can you also inform me if there are any other than the Silurian maps?—*H. W. Richardson.*

Laurel-leaves.—I noticed the four, rarely only two, spots at the back of the leaves of the common laurel many years ago. I was in a garden on Muswell-hill, Hornsey, and my attention was drawn to the spots by noticing a number of bees, not the common honey-bee, alight on the leaves in a steady business-like way, and run rapidly down the middle of the leaf, turn briskly under to the side where the spots are found, suck the juice from the four ending spots in succession, and fly away. I have since examined these spots, or (?) excretionary glands. At some seasons of the year they exude each quite a respectable drop of a sweet juice; at other times the spots are dry and brown. I have never seen them on any other save the *common* laurel-leaves. I should be glad to know what species of bee it is that seems to know and like so well this nectar or syrup. When I first observed the spots I was more interested in them than my little guides, and so lost the opportunity of settling the question as to their species.—*S. M.*

Piece of Coal.—Allow me to correct two glaring mis-statements in the "Story of a Piece of Coal," with which your fifth volume commences. The Honorary Secretary of the Norwich Geological Society there states "that, during the carboniferous period, there stretched across what is now central England, a hilly barrier, which separated two coal-formations going on contemporaneously." A rough sketch (fig. 40) will show the fallacy of this hypothesis better than mere description. The coal-measures were deposited conformably over the Millstone Grit, and it was not till after the close of the carboniferous period that the upheaval of the range occurred. It is easy to imagine the continuation of the beds which have been cut off by denudation subsequently. But the next error is still more glaring. I refer to the statement that the mountain limestone was formed *simultaneously* with the coal-measures! Considering that the mountain limestone underlies the latter by several thousand feet of Millstone Grit, I think it is needless to comment upon this most novel hypothesis.—*W. H. Dalton, Geol. Survey.*

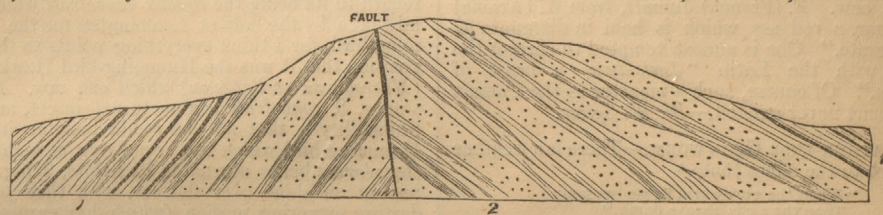


Fig. 40. Ideal Section across the Pennine Chain. 1. Coal-measures. 2. Millstone-grit.

The Nightingale.—I read in the *Western Morning News* of this day (January 11th) that "the valley between Liskeard and Moorswater (in Cornwall) is now tenanted by a nightingale, which warbles enchanting, but untimely music." Is it not a very unusual occurrence at this season of the year and in that locality?—*A. J. Davy, Torquay.*

Growth in Greengage.—In the month of July last year, I was preparing to eat a fine-looking greengage, when on opening it to remove the stone, I found the kernel had germinated, and a radicle had appeared at one end of the stone, which was partly open, and a delicate primule at the other. As it looked healthy, I carefully closed the fruit around it, and planted it *en masse*, but am sorry to say it perished, I believe owing to the continuous rain. —*H. P.*

Books and Papers on Carboniferous Faunæ. —I have had numerous applications to recommend works in which information may be had respecting carboniferous faunæ, and as there is no single work in which the information at present possessed has been condensed and illustrated, I beg that you will permit me to refer your readers to some of the many sources from which valuable information may be obtained:—Annals of Natural History, February, April, May, June, 1868; Proceedings of the Geological Society, vol. xviii., p. 291; vol. xix., p. 63; Transactions of Royal Irish Society, vol. xxiv., p. 351, plate 19; Memoirs of Geological Society, 1859, p. 52; Ditto, Decades vi. and x; Transactions of Geological Society, series ii., vol. vi., plate 43, fig. 1; Owen's Dental Characters of Genera and Species of Fishes and Reptiles from Low Main Coal-seam, Northumberland; Geological Magazine, vol. vi., pp. 323, 378; Ditto, Aug., Nov., Dec., 1868, and January, 1869; Quarterly Journal of Geological Society, vol. xxii., pp. 596, 470, 599; M. Agassiz, Poissons Fossiles, 8 vols.; Ditto, Du Vieux Grès Rouge; Transactions of Manchester Geological Society, vol. i., p. 16; Transactions of Tyneside Naturalists' Field Club, vol. vi., p. 231; Owen's Odontography; Owen's Palæontology; Owen's Homology of the Vertebrate Skeleton; Buckland's Geology and Mineralogy; Page's Handbook of Geology; Page's Geological Terms; Chambers's Encyclopædia; Proceedings of the Palæontographical Society; Acadian Geology by Dawson, pp. 179, 353; Proceedings of North of England Institution of Mining Engineers; Sedgwick and McCoy's British Palæozoic Fossils; Miller's Footprints of the Creation; Science-Gossip; Scientific Opinion. From any of the works enumerated valuable information may be derived.—*T. P. Barkas, Newcastle-on-Tyne.*

Substitute for Nose-pieces.—There is an error in the description of my sketch (fig. 15, in the number for last month). I wrote, or should have done so, lower end of "body," and not, as printed, "object-glass." (Of course the *upper* end of *object*-glass goes into the *lower* end of *body*.)—*James Vogan.*

[It is printed as our correspondent wrote it; hence the error is his own.—Ed. *S. G.*]

To repair Corallines.—Can any one inform me how to mend a piece of coralline from the Mauritius? Arabian cement and plaster of Paris have been tried, but without success.—*F. H., Eastbourne.*

[Is it a coral or a coralline?—Ed. *S. G.*]

Dendritic Spots.—I have for a length of time been puzzled to know what these are. They certainly look like some fungoid growth, but I cannot feel so sure about it as "J. T. G." I have often tried, but can find no spores, neither can I make out that the spots grow, nor yet increase in number, as they would do were they a kind of fungus; and I cannot find them on all sorts of paper. I have now by me two kinds of foolscap which have been kept in the same place. One sort abounded in spots when I had it, but they have certainly not become more numerous during the past year or more. On the other lot of paper, about half a ream, I can find none. May they not be some crystallization which takes place in the making of the paper? I have looked into some old books which have got rather discoloured with damp, but do not find them, though there *is* a black fungus of quite a different appearance which is produced, and does grow and increase. Perhaps "J. T. W." can procure and figure the spores, which would set the matter at rest as to the vegetable nature of the spots.—*E. T. Scott.*

Luminous Centipede.—While walking in the garden one night with a friend, we observed a luminous appearance on the walk by the side of the lawn. It looked like a number of luminous grains

of sand arranged in a row, and all moving about very quickly. We took it up and carried it to the light, and found that it was an animal like a centipede, only a good deal longer, more slender, and with many more legs. It is very common in the kind of places in which centipedes are found. On going to the British Museum I saw an animal that I thought was the same, called *Geophilus carpophagus*. The luminosity did not seem to proceed from a wound, as it was all over from head to tail.—*K. W.*

An Ejectment for Ants.—A lady for many years has had the misfortune to have her best plums and pears infested with ants, so that the inside of the ripe fruits has been partially filled with these little creatures. Boiling water, lime, salt, tobacco-water, aloes, guano, were tried and failed; indeed, as one of your correspondents said, those articles appeared to agree with them, and made them more lively than ever. An old gentleman gave information that train-oil would give ants a clear ejectment. On going to purchase the oil, the druggist said it would be a more certain mixture if one ounce of the flowers of sulphur were mixed with two pints of the train-oil. This mixture was applied with a whitewash brush on the wall and on the trunks of the trees for the height of two yards. The effect has been that only one ant has been seen during the last summer, and none of the fruit infested by them.—*John Higginbottom, F.R.S.A., Nottingham.*

Laurel-berries, &c.—The question asked by Mr. F. J. Battersby, in a recent number of Science-Gossip, is one attended with much interest, and relates to a subject but little attended to by botanists generally. It is a well-known fact that the common Laurel (*Cerasus Lauro-cerasus*), which must not be confounded with the *true* Laurel of the ancients (*Laurus nobilis*), contains a virulent secretion—prussic acid—in large quantities. It is also well known that the fleshy portion of its dark purple berries, as they are erroneously called, is edible when *perfectly* ripe; in fact, I have eaten them myself in large quantities without experiencing anything unwholesome; still I have doubts as to whether the kernels do not contain a poisonous principle, as do those of the delicious peaches, nectarines, &c., of our gardens. Instances are on record of death having been occasioned by partaking of them in quantity. I am of opinion that Laurel-"*berries*" (drupes) are poisonous whilst in a young state, their flavour at that period being similar to that of the leaves. *Why* any particular plant (or order) should absorb and secrete in itself *prussic acid*, as the Laurel; *Solanine*, as by the Solanums: *Atropine*, as by the Deadly Nightshade (*Atropa Belladonna*); *Theine*, as by the Tea shrub (*Thea*), &c., is a mystery difficult to explain. *Why* should apples, pears, and other of our common fruits differ in flavour? Take apples, for example. There are in cultivation several thousand named varieties; yet out of this immense collection scarcely two varieties can be named as possessing *exactly* the same flavour. In the case of varieties, as in the example already named, it is highly probable that all the natural secretions are present, such as *malic acid*, sugar, &c.; but that they exist in different proportions in nearly every variety, and thus occasion differences of flavour. It may be asked, What causes the secretions to exist in different proportions in separate varieties? I have asked this question many times; I have put it to some of the leading horticulturists with whom I have had the opportunity of conversing; and never yet received a decided answer. It is only by patient observation that we can wrest many of Nature's secrets from her grasp. Some of her problems are difficult to solve, and can only be thoroughly mastered by continual observation and well-directed study.—*F. W. Burbidge, Somerby, Oakham.*

October Lilac.—During the past autumn, I have, on two separate occasions, observed the common Purple Lilac in bloom. In one instance, it is but fair to state that the plant had been forced the previous spring. In the other case, the plant commenced its growth very early in the spring, being in a warm, sheltered situation, and the summer being hot and dry, the wood became ripened early. The autumnal rains started some of the most prominent buds, and it produced several clusters of beautiful and delicately-perfumed purple flowers, which, according to rule, ought not to have appeared until the succeeding spring.—*F. W. Burbidge, Somerby, Oakham.*

Spiders suspending a Stone.—Might not the stone referred to by "J. F. D.," p. 283, as suspended from a spider's web, have been used by the spider appertaining thereto as a means of keeping its web distended, or to steady it from the effects of the wind?—*F. W. Burbidge, Somerby, Oakham.*

Luminous Worm.—One evening in September last I observed and captured a centipede, which emitted a light so much similar to that of a glow-worm, that at the time (it being nearly dark) I mistook it for one. I was surprised, upon examining it in the light, to find it a centipede. After having had it in my hands some minutes, I placed it under a glass for future examination; and upon going into a dark room my hands shone as though I had rubbed them with a piece of phosphorus. This luminous appearance I found resulted from a minute quantity of viscid matter which had adhered to my fingers whilst I was examining the polypodian luminary itself. The specimen I observed was to all appearance perfect and uninjured, and shone brightly at times as it moved quickly along a gravel path. In reply to the remarks of Mr. G. J. Dew, I would say that I believe the "*insect*" he refers to in the December number of Science-Gossip does naturally emit a light, although such light may shine much brighter when the "*insect*" suffers from a fracture, as Mr. Dew states *was* the case with the specimen he observed. The luminous centipede observed by myself, and which I have no doubt is identical with the one seen by Mr. Dew, was nearly two inches long, slender, very active, and of a pale yellow colour. Probably some of the correspondents of this periodical may have observed this luminous phenomenon, and be able to furnish us with its scientific appellation.—*F. W. Burbidge, Somerby, Oakham.*

What are the specific Differences between *Potentilla tormentilla* and *Potentilla reptans?*—*Potentilla reptans*, the common creeping cinquefoil, has a filiform creeping stem; *Potentilla tormentilla* (tormentil) an ascending dichotomous one. *P. reptans* has quinate leaves and obovate leaflets; the *P. tormentilla* ternate leaves and elliptical lanceolate leaflets. They are not quite so serrated (toothed) as those of the *P. reptans*. These are, I believe, the chief specific differences between the two plants, for we often find a *tormentilla* with five petals and a ten-parted calyx, and the different species of Potentilla are sometimes found varying with four or five petals.—*Helen E. Watney.*

NOTICES TO CORRESPONDENTS.

Leighton's Angiocarpous Lichens and Monograph of British Graphideæ, wanted to purchase.—Address, J. Bowman, Cockan, Lamplugh, Cockermouth.

E. C. J.—*Encalypta streptocarpa.*—*R. B.*

J. B. L.—1. *Brachythecium albicans.* 2. *Grimmia trichophylla.* 3. *Racomitrium ellipticum.*—*R. B.*

H. C. Leslie.—The Cynips is *C. lignicola*, Hartig; and the Ichneumon is *Callimone Devoniensis*, Parfitt.—*C. O. W.*

J. Mc C.—The Blue Bee is *Xylocopa violacea.*—*C. O. W.*

D. H. S.—The leaf, fig. 249, is that of *Cratægus oxyacanthoides*, evidently.

F. G. B.—We cannot revive the subject again after so long delay, especially to add nothing new.

J. G. O.—Your observations should have been sent to the journal in which the discussion is conducted.

E. J.—The circumstance is not at all uncommon.

R. G.—We cannot attempt to name larvæ, &c. Why not rear them yourself, and save us the trouble?

R. B.—*Asplenium Adiantum-nigrum.*

A. L.—We can find two or three similar instances within five minutes' walk of our own domicile.

G. H. A. and J. B. K.—As a controversy has been going on in *Scientific Opinion* on this subject, we decline commencing it.

Errata.—Some correspondents, who complain of errors in printing their communications, are in the habit of writing such execrable scrawls, that it is no wonder the P. D. gets puzzled.

S. S.—English Books printed in India are many of them a disgrace to their authors, and contain more errors than any other books in the language. "Balfour's Cyclopædia" is no exception, and though only a compilation, and a careless one, it would be difficult to say which preponderates, the *right* or the *wrong*. The only satisfaction we can afford you is, that it is the only one published.

Carpological Books.—Our correspondent ("H. S.") will perhaps find the following list answer the purpose: Parsons, "The Microscopical Theatre of Seeds." London, 1745. 4to. —Gaertner, J., "De Fructibus et Seminibus Plantarum." 3 vols. 4to. Stuttgart, 1788-1807.—Dumortier, "Essai Carpographique." 4to. Brussels, 1835.—Couverchel, "Traité des Fruits." 8vo. Paris, 1839.—Richard, "Démonstrations Botaniques, ou Analyse au Fruit considéré en général." 8vo. Paris, 1808.—Ralph, T. S., "Icones Carpologicæ." Part I. 4to. London, 1849.

A. B.—The common Custard Apple is *Anona reticulata*, and the *Cherimoyer* is *Anona cherimolia*. The zoophyte on the Shrimp is *Laomedea dichotoma*, common on various substances within tide-marks. There is no reason to suppose that the volunteers have anything to do with it.

I. T.—At Wheldon's, Great Queen Street, Lincoln's-Inn Fields.

P. B.—No! especially the binocular.

A. C.—Undoubtedly they were little "Hermit Crabs."

H. P.—Mr. Pike, of Brighton, furnishes seaweeds for the herbarium.

G. J. D.—We could not undertake such a task.

A. A., Jun.—Cleaner and better than before, but still capable of improvement.

T. A. H.—The fern is *Polystichum angulare*, var. *grandidens*, Moore; see also var. *oxu*, Lowe.—*J. G. B.*

R. G.—The case-bearing larvæ on *Juncus* are those of *Coleophora cespititiella*, a very common species on the seeds of various kinds of rush.—*R. McL.*

Cossey.—We are decidedly opposed to the use of assumed names, inverted initials, and all subterfuges for disguising the true name or initials of correspondents. If the truth be spoken it needs no disguise.——"Timothy Twaddle," instead of writing to us may devote the time to his own improvement, and save postage stamps.

J. D. H.—*Asplenium bulbiferum* what you term parasites are young plants of the fern, produced upon the fronds.

T. A. H.—Probably a large variety of *Lustrea Filix mas*, but from its condition, and absence of fruit, not safe to determine.—*J. G. B.*

H. C. S.—An infinitely better account of the seventeen year locust has just appeared in the *American Entomologist.*

Planaria.—The following misprints occurred at p. 8. For "Tushellasia," read "Turbellaria;" for "over gliding," "even gliding;" for "flosculent," "flocculent;" and for "diametically," "diametrically."—*A. H. E.*

J. B. may obtain cardboard boxes of all kinds of Mr. Cutter, 35, Great Russell Street, corner of Bloomsbury Street, W.C.

Too Late.—Communications not received until between the 12th and 15th of the month, containing specimens for naming, or queries requiring answer from the editor, cannot receive attention until the following month. This notice is occasioned by the great increase of correspondence, especially at those dates.

March.—Notes of microscopical objects to be sought for during this month are solicited from our correspondents.

EXCHANGES.

Minerals in exchange for British shells or others of the same.—Send list of desiderata and duplicates to G. S. Tye, 58, Villa Road, Handsworth, Birmingham.

Conchology.—Correspondents and exchanges wanted in Terrestrial Conchology.—H. Freedley, Norristown, Pa. U.S.

Lepidoptera.—Southern for Northern species.—E. H. Walland, 19, Oakley Street, Chelsea.

Sections of Wellingtonia (mounted) Gigantea and Cuticle of Yucca for other objects (mounted).—J. Carpenter, Waltham Cross, Herts.

Chalk Fossils (mounted) in exchange for other objects of interest (mounted or unmounted).—Send lists to Rev. J. B. Bartlett, Watton-at-Stone, Hertford.

Fossil Infusoria from Kieselguhr, district of Soos near Eger, Bohemia.—Pollen of Lilium Lancifolium Punctatum, or Lilium Lancifolium Rubrum (mounted), in exchange for other (mounted or unmounted) microscopic objects.—Address, inclosing stamped envelope, to C. E. Osborn, 28, Albert Road, St. John's Ville, Highgate, N.

Scales of Podura, Lepisma, Atropos, and Hair of Dermestes larva (mounted), in exchange for other objects (mounted or unmounted).—J. Shelton, 52, High Street, Bedford.

Sections of Heath stem, Oak, and Datura, offered in exchange for other mounted objects.—Address James Green, jun., 16, Pump Street, Londonderry.

Mosses.—Paludella Squarrosa for any rare species.—Samuel Anderson, Albert Chambers, Whitby.

BOOKS RECEIVED.

"Popular Science Review." No. 30, January, 1869. London: Robert Hardwicke.

"The Quarterly Magazine of the High Wycombe Natural History Society." Vol. II., No. 3, January, 1869.

"The Monthly Microscopical Journal." Edited by Henry Lawson, M.D. No. 1, January, 1869. London: Robert Hardwicke.

"Young England's Almanac and Naturalists' Calendar," for 1869. London: Tweedie.

"The American Entomologist," No. 4 (No. 3 not received). St. Louis, Mo.: Studley & Co.

"Scientific Opinion." Nos. 9, 10, 11. London: Wyman & Sons.

"Land and Water." Nos. 154, 155, and 156, January, 1869. London: 80, Fleet Street.

"The Garden Oracle and Floricultural Year Book, 1869. Edited by Shirley Hibberd, F.R.H.S. London: Groombridge & Sons.

"The Dental Register." Edited by J. Taft and G. Watt. Vol. XXII., No. 11, November, 1868. Cincinnati: Wrightson & Co.

"American Bee Journal." Vol. IV., No. 7, January, 1869. Edited by S. Wagner. Washington, U.S.

"Newman's Entomologist." No. 61, January, 1869. London: Simpkin, Marshall, & Co.

"The Gardener's Magazine," for January, 1869. Edited by Shirley Hibberd, F.R.H.S. London: E. W. Allen.

"Descriptive Catalogue of Flower Seeds." By William Thompson, Tavern Street, Ipswich.

"The Canadian Naturalist and Geologist." Vol. 3, No. 4, January, 1868 (sic). Montreal: Dawson Brothers.

"The American Naturalist." Vol. II., No. 11, January 7, 1869. Salem: Peabody Academy of Science.

Communications Received.—J. B.—J. M. C. (ineligible).—S. C. H.—R. B.—E. J.—W. H.—J. G. O.—J. Y. H.—W. W. S.—R. C. B.—C. O. G. N.—W. G. B. (too late).—F. H.—G. S. T.—F. S.—H. W. R.—A. A., jun.—J. V.—A. B.—J. W. P.—F. G. B.—W. T.—E. T. S.—S. B.—R. G.—D. H. S.—J. H.—H. J. M. T.—W. K.—J. R. S. C.—B. T. H. M.—G. R.—S. M.—J. B. J.—J. L. M.—R. T.—H. E. W.—L. S.—A. C.—T. P. B.—H. P.—T. A. H.—J. C.—J. B. L.—A. P.—W. W.—J. H.—C. E. O.—A. H. E.—J. B. K.—J. B.—B.—H. S.—J. B.—B.—R. H.—W. O. (Dundas).—A. B. F.—A. A., jun.—H. F.—C. C. W.—A. B.—W. M.—H. S.—R. W.—J. E.—M. A. J.—O. S.—M. F. D.—E. H. W.—T. H. H.—W. H. D.—W. J. D.—A. M. B.—F. S.—F. A. K.—A. J. D.—J. G., jun.—T. S.—R. S.—H. C. S.—H. W. R.—J. S. T.—J. W.—J. S.—H. B. B.—H. G. G.—L. A. G.—M. M.—J. R.—E. B.—J. G. B.—R. R. W.—E. I.—E. P. H.—S. A.—S. and S.—I. T.—P. B.—H. H. K.—J. D. H.—H. H. M.—P. P. A.—S. M.—R. A. S.—S. H.—J. J. S.—W. R. T.—W. H.—T. S.—G. H. A.—J. R.—G. E. F.—F. F.—E. C. J.—E. P. H.—A. M.

MYRIAPODS.

By MAJOR HOLLAND, R.M.L.I.

"PLEASE, sir, here's one of them nasty mischiefull many-legs as I told you pisened the melon-bed so as we never got nothink off of 'em. Nobody can't say as they wasn't took care of, for I was a waterin' and a waterin' on 'em mornin', noon, and night, all along the droughty summer. It stands reasonable-like to natur' as *water*-melons should take a sight o' water: twasn't my overdoin' on 'em with mīsture as rotted the roots off; 'twas these here plaguey varmint"!!

Having delivered this oration, and proved to his own entire satisfaction "as how he was right all along, and master was mistook" about poor *Curcurbita citrullus* having been drenched to death with icy pump-water, the obstinate old gardener deposited his writhing scapegoat on the study table, and retired triumphant to the coach-house, where he whistled loud pæans of victory to the Bramahs and Cochins of the stable-yard.

What yellow-brown *Myriapod* is this? His flexible body, which he is tying into all manner of knots, is composed of no fewer than eighty-one distinct segments, to say nothing of the odd one at the end of the tail, and the five which have coalesced to form the head. If we count these five fused segments as one (as we do the four which Professor Huxley tells us combine together to make up our own human brainboxes), then his body is made up of eighty-three somites, of which the cephalic, the anterior-thoracic, which bears that terrible pair of hooked maxillipedes, and the anal are the only three presenting any marked differences from each other, and from the eighty others which are as "strictly uniform" as the helmets of the metropolitan police.

How the fellow shuns the light! Does his conscience trouble him? Does he feel himself guilty of "pisenin'" the melons, that he wriggles so uneasily until he succeeds in burying himself out of sight in the silk tassel of the penwiper? A burrowing troglodyte by nature, I suspect, and on closer examination he proves to be such — *Geophilus subterraneus* (underground earth-lover), of the family *Geophilidæ*, of the sub-division *Chilopoda* (foot-feeders), of the order *Myriapoda*, of the class *Articulata*, according to Newport.

He has no eyes; he doesn't want any; he passes his life in the dark, underground, tearing up old shreds of farmyard manure and vegetable matter, always preferring scavengers' work when he can get it, and doing good service by eating up the helpless, soft, succulent larvæ of the hosts of insects that prey upon our crops. The sins of the wire-worm have been laid to his charge; his third cousins the *Iulidæ* do undoubtedly steal our potato "sets," and bore into young peas, or rather into old peas just "spritting" and about to send up young ones; but it seems doubtful if he himself ever attacks fresh or living vegetables: he seems to be one of nature's many *vidangeurs*, and because he is found minding his business and eating up rottenness, he is accused of producing it. As well might we say that our sewer-men produce typhus and cholera. But he has even been charged with having *caused* the potato disease! because he was found labouring to remove the affected tubers. Beware, ye brave surgeons who fight with zymotic demons and risk your own lives to lift up stricken humanity, lest ye be arraigned for *producing* all the long catalogue of human ills that figure in our sanitary statistics.

Our captive has no eyes; he has, however, an

'ocellus," a mere pigment speck behind the base of each of his fifteen-jointed antennæ, and he has the smallest possible threadlet of an optic nerve. I expect he cannot see, in the ordinary sense, but can distinguish between the light with which he has nothing to do, and the darkness in which he feels his way about with his antennæ when doing his duty like a humble vegetarian jackal, or adjutant.

The *Myriapods* have been placed at different times in different classes of the animal kingdom: in one famous system we find them under the head of *Crustacea;* another, in remote times, ranged them with the *Hemiptera* and *Orthoptera* as "insects which only undergo a partial metamorphosis." They have slight affinities with both, and even with the *Annelids;* like the latter, they grow in length by the successive addition of new segments between the penultimate and anal. The lower subdivision, the *Chilognatha*, by the situation of their reproductive orifices, seem to betray *Crustacean* relationships; but we remember that in the first phase of their development they displayed three pairs of legs only, like the typical hexapod *insect*. They appear to stand out the strong, well-marked, first link of that long chain which bridges over the mighty gulf which rolls between the creeping worm and the flying insect. The Myriapod is the lowest *articulate* animal, the Annelid the highest *annulose—i. e.*, according to the old scheme of classification, the latter term has recently been used with a widely extended signification. Ten years ago the subdivision *Chilopoda* consisted of four families, including ninety-four genera; and the lower subdivision, *Chilognatha*, of four families, containing seventy-five genera; a tremendous total of variations of a type; but since then they have been shuffled and cut, and lumped and split, like the German States, till nobody knows which is which.

"An *articulation* complete in all its mechanical appliances is not produced in the animal kingdom below the *Myriapod*. A *joint* is the symbol of organic superiority; it is not an arbitrary symbol; it is a unit in an assemblage of signs which proclaim a newer and higher combination in the arrangements which constitute 'life.' At this limit in the animal series the fluids and the solids of the organism undergo a signal exaltation of standard. The system of the chylaqueous fluid exists no longer in the adult organism, it is present only in the embryonic. It is supplanted by that of the blood proper. Coincidentally with the 'joint' at the frontier of the articulate sub-kingdom there occurs a heart to circulate the blood, fibrine, and with it an order of floating corpuscles more highly organized in the fluids; a wondrous development of the muscular apparatus, striæ in the muscle-cell, a rapid increase in the dimensions of the cephalic ganglia, and in those of the organs of the special senses. It is here in the history of the reproductive system that the diœcious character is first unquestionably assumed. These are noteworthy events in the ascensive march of organic architecture."—Dr. Williams, *Mag. Nat. Hist.*, 1854.

The armour-plates of the cylindrical *Iulus* are composed of a semi-crustaceous hard substance, but in the *Scolopendridæ*, which our "false wireworm" closely approaches, the integuments are of a flexible chitinous substance, the back of each segment is covered by a plate, the ventral surface by a somewhat smaller plate, the epimeral portions, as well as the interspaces between the somites, are covered by a loosely fitting coriaceous membrane of much thinner texture.

The circulating system has been a battleground for men with great reputations. The nervous and reproductive systems, and the development day by day from the ovum, have been drawn out with elaborate minuteness by Newport—in *Philosophical Transactions* for 1841 and 1843—but I have not yet fallen in with a drawing of their tracheary system, which is well worthy of careful study.

The spiracular orifices are not placed as in insects between the segments, but in the side of each, a little below the dorsal plate; they are not minute apertures, nor vertical slits, neither are they furnished with "guards" of setæ, or hairs, to exclude dust and foreign bodies; but they are circular openings, each with a well-defined hard-looking ring, over which the tough but pliable lateral membrane passes, lining the entrance, which is directed slightly backwards, and can be closed by a sphincter muscle. The tracheæ are very large in the anterior segments, occupying no small portion of their internal cavities, but they decrease in diameter in proportion as the segments recede from the head; possibly there may be need for a more abundant supply of oxygen in the region of the brain, and in the first formed portions of the body, than in the equally large but more remote additions which are from time to time developed near the caudal extremity.

Let us detach half a dozen pairs of spiracles, with their tracheal appurtenances complete, from the dissected tail end of *Geophilus* the much maligned, float them on to a slide, and bring the "two-thirds objective" to bear upon them. (Fig. 41.)

A ladder of shining silver, a very Jacob's ladder, bright and beautiful enough to have been let down from heaven for the feet of angels.

The six uprights and the cross rungs are all constructed of the same tubular wire rope glistening with a dazzling metallic lustre, and without a flaw anywhere. The tubes are composed of an outer and an inner coat, containing between them the spiral coil, to which they are closely attached; a delicate membrane also connects the turns of the spiral with each other. It is interesting to compare these animal breathing tubes, with their

analogues *the spiral vessels* of the vegetable kingdom; the latter are easily extracted from the young shoots of asparagus, or from the leaves of the hyacinth. The spring-like coil ensures a free open passage for the air which rushes in by the spiracular orifices, expiration being effected by the contraction

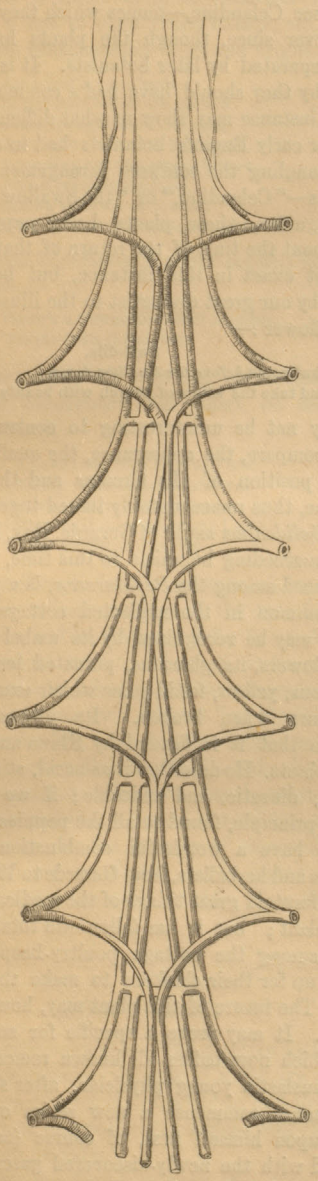


Fig. 41. Tracheæ of *Geophilus subterraneus*, × 140.

of these elastic channels, by which the effete air is forcibly expelled through the openings by which it originally entered.

The main tracheæ pass down the axes of the blood-channels, floating in the vital fluid, which they revivify with the oxygen which they thus carry to and through the life-stream. We are told that the air-pipe does not terminate where the wiry-looking spiral comes to an end; the latter dwindles away imperceptibly to nothing, but the trachea from thence becomes membranous, and, dividing into innumerable branches, which bear to the main trunks the same relation that the capillaries bear to the arteries, penetrates the substance of the muscles, inconceivably fine branches having been traced accompanying the nerves, while the ultimate plexiform extremes of the system aërate immediately the solids. "In all the transparent structures of insects every observer may prove for himself that the blood-currents travel in the same passages as the tracheæ, but this is only the case with the primary and secondary branches, *never* in the capillary tracheæ; the blood corpuscles of the *myriapod* exceed by several times in diameter that of the extreme capillary membranous tracheæ; it is perfectly marvellous to what inconceivable minuteness the air-current is reduced in travelling along these tubes." What a simple and efficient plan, what an economy of space is this arrangement of tube within tube, for aërating the blood in a class of lowly creeping things of earth that do not attain to the dignity of lungs! There is a saving of time too, for the blood is made arterial while on its journey, and thus travels direct (without the delay of passing off to special pulmonary organs) to the performance of its functions, removing, replacing, renewing, sustaining, building up, absorbing. Having accomplished these, and become as it were venous, it passes into the intervisceral spaces, and there, receiving an increment of fresh globules, the products of digestion, completes its circuit by returning through distinct valvular openings into the dorsal vessel from which it was first distributed. "Among the *Chilognatha*," says Siebold, "the *Iulidæ* are noticeable for the very simple character of their trachean apparatus; their air-canals neither ramify nor anastomose. With the *Glomerina* the tracheæ are branched, but do not anastomose; but those of the *Chilopoda* are very ramose, and their large trunks intercommunicate at their origin by longitudinal and transverse anastomoses, so that each stigma can introduce air into the entire trachean system." It was chiefly with the view of drawing attention to this last-mentioned fact (a most striking evidence of design)—to this remarkable example of the exquisite adaptation of the creature's construction to the condition of existence ordained for it by the Creator—that I began this bit of simple gossip about *Geophilus*. In his subterranean career he constantly meets with accidents which link him up in sympathetic association with Brunel and Stephenson, and the Bedouin of the desert. He never bored a practicable highway beneath the bed of Isis, nor made firm the foundations of an iron road across the quaking surface of Chat Moss; neither has he braved the

burning sand-blasts of the Simoom; yet in his degree he has met with such like critical experiences a hundred times.

One day the roof of his tunnel crashed in upon him, and buried a dozen of his segments, squeezing the very breath out of them; on another day the rain had saturated the rubbish heap he was toiling in, a score or two of his somites were under water, and he had to "batten down" the stigmata belonging thereto to save those portions of himself from drowning; and yet again, in the scorching dog-days, a hot wind swept the earth, and a dry and thirsty clod, crumbling away, discharged an avalanche of dust which overwhelmed nine-tenths of him: in each and all of these catastrophes his life would not have been worth ten seconds' purchase, even with his many spiracles, but for the anastomosing branches of his wind-pipes, the cross rungs of his air-ladder, which enabled the air received by the unchoked segments to pass in every direction through the whole system. That there is perfectly free communication from any one spiracle to the whole network of air-passages may be seen by examining the figure which I have given, and if any reader has still a doubt on his mind he may remove it, if he is a dexterous manipulator, by dissecting out the tracheary apparatus of the first *chilopodous myriapod* he can lay hands on, and, stopping the orifices of all the spiracles but one, he will find that through that one he may inject the whole labyrinth of air-vessels with carmine.

I observed that a correspondent, J. G. D., in December last, was much surprised at the display of a phosphorescent light by a centipede he had found. *Geophilus electricus*, a member of the same family and a near relation of our *Subterraneus*, must have been the pyrotechnist he chanced upon. "The caustic brown fluid which most *Myriapoda* when touched emit from a row of orifices, *foramina repugnatoria*, situated on the sides of the segments of the body, and which exhales an odour like that of chlorine, is secreted by small pyriform glandular follicles situated immediately beneath the skin; it is from glands upon the sides of the body analogous to these that *G. electricus* emits a luminous liquid."

It would be most interesting to ponder over the three varieties of breathing apparatus mentioned by Siebold, and to note their special adaptations to the life conditions and necessities of the three distinct genera provided with them; and there are other wonders in the ways and mechanism of each and all of them that one longs to dwell upon; but we are not essayists here, only cheerful "gossips" of the wayside, who seek to be merry and wise, accurate though simple and amusing. We have run to the end of our tether, and must say good-bye to *Geophilus subterraneus* and all the myriapods.

Bury Cross, Gosport. J. Y. H.

THE CELANDINE.

WHEN John Gerarde, about three hundred and fifty years ago, published a catalogue of the plants in his botanic garden on Holborn Hill, two appeared in it under the names of the Greater and the Lesser Celandine,—names which they have retained ever since, though the plants have been widely separated by later botanists. It is not easy to see why they should have had a common name; and this instance may show us what difficulties Ray and other early English botanists had to overcome in disentangling the confused arrangements of the herbalists—"Celandino," or "the Swallow:" so the word signifies, these plants being supposed to flower about the time of the return of that bird; a fancy not exact in this instance, but beautifully adapted by our great dramatist to the illustration of another flower:—

> Daffodils,
> That come *before the Swallow dares*,
> And take the winds of March with beauty.

It may not be uninteresting to contrast, as we cannot compare, the appearance, the qualities, and present position of the Greater and the Lesser Celandine, thus unaccountably linked together.

The *Chelidonium majus* of Gerarde, Ray, Linnæus, and all succeeding botanists to this time, now properly placed among the *Papaveraceæ*, is a perennial plant common in the neglected cottage-gardens, where it may be recognized by its umbel of small yellow flowers, its glaucous, pinnated leaves, and the copious, yellow, fœtid juice which exudes from every part when broken. Its properties are so active that it is figured by Rhina among poisonous plants. He describes it as acrid, stimulating, aperient, diuretic, and sudorific; if we add the narcotic principle, found in all the poppies more or less, we have a wonderful combination indeed. Botanists and herbalists, from Gerarde to Withering, have all foretold great things of the medical efficacy of this plant; but it has fallen into total neglect, except among the cottage poultry-keepers, who chop it up for their chickens to make them more lively! The future of this plant may, however, yet be great. It may prove a specific for some complaint which now baffles all known remedies; but the enthusiastic young physician, after such long disuse, must commence a new series of experiments—upon himself first, of course (as Sir H. Davy did with the newly-discovered gases), before he ministers it to his patients.

The Lesser Celandine (*Chelidonium minus* of Gerarde, and *Ranunculus ficaria* of Linnæus) has no such formidable array of attractions. Its charms are summed up in very few words—it is our earliest Buttercup. On the verge of winter, long before the Swallow dares, and before the Daffodils dance in the March winds, the Lesser Celandine opens its

flowers in the transient sunshine, and closes them again under every passing cloud. It is found almost everywhere on humid soils, in the lanes and hedgerows, on the edge of coppices and among the grass; but it is on the banks of streams and watercourses, where the tuberous roots can strike deep, that its chief beauty is seen: there the star-like flowers, resting on a bed of deep green foliage, are, in the early season, conspicuously large and bright.

> Ere a leaf is on a bush,
> In the time before the thrush
> Has a thought about its nest,
> Thou wilt come with half a call,
> Spreading out thy glossy breast
> Like a careless prodigal,
> Telling tales about the sun
> When there's little warmth or none.

So William Wordsworth addresses this flower of his adoption:—

> There's a flower that shall be mine,
> 'Tis the little Celandine.

It was near middle life with him before this poetic attachment commenced, for which he seems to reproach himself:—

> I have seen thee high and low
> Thirty years or more, and yet
> 'Twas a face I did not know;
> Thou hast now, go where I may,
> Fifty greetings in a day.

And for well-nigh half a century afterwards it cheeered his solitary musings by the waterfalls and in the woods, and he "blessed it for fellowship."

The sentiment survives the poet, in the memory of his disciples and friends, in the congenial minds which "make their own delights" in the calm pursuits of country life, and it is symbolized upon the Laureate's tomb. Tourists to the Lake districts—and there are many—who visit the churchyard and church of Grassmere, when they read the epitaph and do homage to the memory of departed worth and genius, see a flower, with folded petals, sculptured upon the white marble: it is the little Celandine. S. S.

ABOUT CILIA.

IF we examine any one of those active little infusorial animalcules, millions of which are present in every drop of ditch-water, we shall find that their only organs of locomotion are certain hair-like processes known as *Cilia*.

These cilia are found more or less, with two or three exceptions, in every class of the animal kingdom. In some of the lowest forms of animal organization we meet with we find that they are of the greatest possible use, serving as organs of locomotion, or as a means of procuring food by creating currents in the water; whilst in the higher animals—the mammalia for instance—they serve a more subordinate though no less useful office, that of conveying the mucus found in different parts of the body to openings, from which it may be easily expelled. They are found on the gills of the tadpole, where they assist the respiration by causing the water to flow over the branchiæ, on the surface of the body of the Spongidæ, the Polipi, the Medusæ, and the Echinodermata, and also in the alimentary system of many animals. The Unio and Aordon—the common fresh-water mussels—which have no prehensile or masticatory organs, are entirely dependant for a supply of food, consisting principally of infusoria, on the motion of the cilia lining the mantle and the surface of the gills, which serves to urge it forward to the region of the mouth.

When in rapid motion they have the appearance of a wave quickly passing over the surface to which they are attached, reminding one of the action of a strong wind on a field of corn. They are seen much more distinctly when the movement is somewhat slackening than when they are in full activity. The motion resembles that of an oar, and it has been found that they can rotate on their arex through a quarter of a circle, so that in the return stroke the blade is parallel to the direction of motion.

One of the most curious facts in connection with the subject is that the activity of the cilia does not immediately cease on the extinction of the life of the animal on which they are found, for their motion has been observed in the tortoise for fifteen days after death, when putrefaction was far advanced, and in the frog for four or five days. The cause of their motion has long been a debatable point among naturalists; but, as the motion is found after systemic death, it is thought to be connected with the contractile substance of which muscles are composed. If it does not depend upon this substance, it has been argued it must be caused by some substance of the nature of which we know nothing, and of the very existence of which we have no proof, for our most powerful microscopes have as yet been unable to discover the motor power of these interesting processes. It is, however, evident that that power, whatever it may be, must be connected with each cilium, for there can be no doubt that they move individually, and without connection with their neighbours, except as to the direction of their motion.

There are various external agencies, by the application of which the movements of vibritile cilia may be greatly modified or altogether arrested. In warm-blooded animals a cold of 43° F. or under will permanently stop their motion, but in cold-blooded animals they will bear a much greater degree of cold, a mixture of ice and water having no apparent effect on them. A gentle warmth, such as may be caused by breathing on them, will in many animals revive them after they have become languid.

In many marine molluscs, such as the sea-mussel,

their motion is destroyed by immersion of the animal for a few minutes in fresh water. Professor Lister has made some valuable investigations on this subject. In a paper communicated to the Royal Society in 1858 by Dr. Sharpey (from whom much of our information on this subject has been obtained) he says:—

"Having cut off a small piece of the tongue of a frog, killed about an hour before, and placed it upon a slip of glass under the microscope, with just enough water to permit the free play of the cilia, I held near to it a piece of lint soaked in chloroform, keeping my eye over the microscope. The effect was instantaneous cessation of the previously rapid action of the cilia, which now stood out straight and motionless like the hairs of a brush. I now immediately withdrew the lint, after which the same state of complete inaction continued for about half a minute, when languid movements began to show themselves, and after a lapse of five minutes more the ciliary motion was going on pretty briskly in some parts, and ten minutes later seemed to have almost completely recovered."

From the same authority we learn that this languid state of the cilia is also produced by ammonia, by freshly-prepared mustard, and by strong acetic acid. The effect of most chemicals cannot be ascertained, as the tissues and the substance of the cilia are destroyed by them. The experiments mentioned are most instructive, and most easy of performance.

In several of the lower cryptogamous plants, such as the Vaucheria, cilia are found on the surface of the spores, allowing them to move freely in water, and some of the still simpler Algæ are, even when in the adult state, endowed with such powers of locomotion, owing to the presence of these processes, that their vegetable character, though now completely established, was long a matter of doubt. The motion of the cilia found in these situations is of course influenced by external agents in the same way as when they are found in animals.

W. MURRELL.

University College, Gower Street, N.W.

MOSQUITOES.

THE readers of SCIENCE GOSSIP may possibly remember that more than one writer on the subject of the Mosquitoes supposed to have been met with in this country last summer, spoke most positively as to the identity of its note with that of the East Indian insect; the loud, clear, ringing sound of which they stated to be widely different from that of the gnat, and so peculiar, that no person who has once heard it can ever mistake it for anything else. At the same time it was stated in more than one journal, that all the mosquitoes captured turned out to be specimens of *Culex pipiens*, but no explanation was offered as to the strange fact of the gnats' note undergoing such a remarkable change. Being anxious to see whether any light could be thrown on this obscure phenomenon, I applied to a friend who had been in East India, and on whose statements I knew I could thoroughly rely. After some delay, over which neither he nor I had any control, I received his answer, which I now give exactly as it reached me, in the belief that truth, even when late, will always be welcome to the readers of SCIENCE GOSSIP. J. L. MILTON.

"MY DEAR MILTON,—During the years 1845-6-7, I made two voyages to India, visiting the port of Bombay twice, and Calcutta once.

"Being then young and succulent, my arrival created quite a sensation among the mosquitoes, and their attentions to me by night and by day were more flattering than agreeable. My opportunities of learning the habits of the East Indian animal have thus been considerable.

"In July last (1868) I spent a few days in the house of a friend at Hampstead. The weather was very hot, and I slept with my bedroom windows widely open. One morning about 4 a.m. I was suddenly awoke by a sound which I had not heard for more than twenty years, but which in a moment set me on the defensive. It is impossible for any one who has suffered as I have done, to mistake the sharp trumpet of the mosquito, and the peculiar and irritating mode of attack. For a time I defended myself vigorously, but at last his pertinacity prevailed, and I allowed him to have his meal, which he took immediately over my left eyebrow.

"The consequences which followed were exactly the same as those which used to follow the sting of the East Indian insect—swelling, with intense itching, which gradually increased for about 36 hours, when it slowly subsided, with some desquamation. The whole quite unlike the effect produced on me by the sting of the ordinary gnat, with which, also, I am quite familiar.

"The insect which stung me was a mosquito in sound, in manner of attack, in the effects of the sting, and in appearance; for it was quite light enough for me to see him distinctly when he made his retreat, brandishing his spindle shanks with that air of jaunty defiance which irritates his angry victims almost to madness. What scientific name an entomologist would give him, I cannot tell. He did a mosquito's work upon me. "R. T."

CHICAGO MICROSCOPICAL CLUB.—A new Microscopical Club, attached to the Academy of Sciences, has recently been inaugurated at Chicago, Illinois, U.S.

MONSTERS OF THE DEEP.*

THE well-known Dutch naturalist, P. Harting, published, in 1860, a memoir on certain gigantic cephalopods, some extracts from which (as the work is not easily accessible) may be interesting to the readers of SCIENCE-GOSSIP. The conclusion he draws, or more properly the final suggestion he throws out, appears to me to be particularly valuable. "It has long been matter of notoriety," he observes, "that cephalopods of an enormous size exist in the sea, although no naturalist has hitherto been favoured with the opportunity of examining and reporting on a complete animal at his leisure. The largest individual, of which a detailed description, accompanied by figures, has been published, is the *Ommastrephes giganteus* of D'Orbigny. Its total length was 44 inches, that of the body alone being 17·5 inches."

The stories of Olaus Magnus's kraken, and of the colossal poulpe, which Denys de Montfort represents as entangling in its enormous arms a three-masted frigate, are but wild exaggerations of an incontestable truth.

Aristotle assigns to the great calamary of the Mediterranean Sea a length of 5 cubits (or 7 to 8 feet). Moreover, he assures us that one Trebius Niger had seen a polype whose body, as it lay on the beach, was calculated to be equal to a 70-gallon cask: each arm was 30 feet long, and so thick as scarcely to be embraced by one man; it weighed about 700 pounds. On the whole, I am inclined to think that this story must not be thrust aside as fabulous; the simplicity of the description and the numerical data are greatly in its favour. After all, the dimensions given (as we shall see presently) do not much exceed those of individuals whose existence is well-nigh proved by modern writers.

Sander-Rang, Peron, Quoy, and Gaimard, have seen animals, or the remains of animals, on the surface of the ocean, with enormous bodies, and arms 6 to 8 feet long. Madame Graham (quoted by Johnston) saw a cephalopod whose arms were 18 feet long; and Schwediaver reports the capture of a cachalot (*Physeter*) in whose gullet was found an arm of a cephalopod, which, though imperfect, measured 23 feet in length. In the Hunterian Museum, London, are preserved the fins, section of arm, heart, and mandible of an onychoteuthis, the length of which, when perfect, could not have been less than 6 feet. The remains belong to an individual encountered by Banks and Solander, the companions of Captain Cook, floating on the sea between Cape Horn and Australia, in lat. S. 30·44, and long. W. 110·33.

One may well believe, with these descriptions before us, that the fears of the pearl and coral fishers are not altogether without foundation. These men declare that they are sometimes seized by huge molluscs of this family, who endeavour to entangle them in their long arms, which are studded with suckers and hooks.

In the present day M. Steenstrup has made extensive and valuable researches into the history of these gigantic cephalopods. A portion only of these researches has been published; but they lead to the conclusion that in the Atlantic Ocean, the Northern Seas, and even the entrance of the Baltic, there exist cephalopods not inferior to those described by T. Niger, Schwediaver, and Madame Graham. M. Steenstrup demonstrates with a rare sagacity that the singular animal which was captured in the Sound, not far from Malmö, in 1546, and to which the superstition of the natives gave the name of the "Sea Monk," was really a cephalopod, allied to Loligo, of a length of 4 Danish ells (8 feet), or, including the tentacular arms, 16 feet.

In 1853 an individual, probably of the same species and of nearly the same size as the "Sea Monk," was cast ashore near Aalbeck, in Jutland. The mandible only was recovered by M. Steenstrup, who has named it *Architeuthis monachus*. More recently he has received from the captain of a vessel portions of an individual picked up in the Atlantic —the pharynx alone is as large as a child's head— to which he has given the name of *Architeuthis dux*. These are not the only instances brought forward by M. Steenstrup.

The question arises—Do these monstrous individuals differ specifically from the smaller kinds, which abound in every sea, and which are perfectly well known to the naturalist? I am inclined to answer in the negative. Mere size can never form an element in the differentiation of species, especially in the case of animals, which probably continue to grow during the whole course of their lives. A neglect of this caution has already led to numerous mistakes. Naturalists have fancied they saw distinct species in individuals, which in reality differed only in age: witness the history of the Orang-Outang and the Salmon.* Now the number of cephalopods of small size is incredibly large, and would be still greater but for the incessant depredations of numerous enemies, such as sea-birds, dolphins, &c. It is not unlikely that a few out of the multitude of survivors make their way to the deeper parts of the ocean, and there in comparative safety continue to increase in size, until at last they acquire those gigantic dimensions, examples of which occasionally come before the world.

Itchen Abbas. W. W. SPICER.

* SCIENCE GOSSIP, Vol. iv. p. 222, 1868.

* (Witness also Bewicke's "Solitary Thrush," which proved to be the Starling in its early plumage; also the "Whitebait," long looked upon as a distinct species, but lately shown by Dr. Günther to be the young of the Herring.—W. W. S.)

SEA ANEMONES.

THERE are few more interesting objects than a marine aquarium, especially if—as in my case—the possessor lives in an inland town far away from the "music of the sea," and the beautiful treasures of the shore that may still be found in nook and cranny or crystal rock-pool, by any one who loves nature's beauties well enough to seek where he may find them.

May I give you a little sketch of one of my small aquaria, as I see it while penning this little bit of "gossip?"

In the centre stands a fine plumose anemone—(*Actinoloba dianthus*) full 4 inches high, with its beautiful fairy plume bending gracefully, like a tree, before the breeze; to the left, a little behind, upon the tip of a piece of rock, is a fine *Anthea* (*var. rustica*) waving its satin-like tentacles constantly, never still. On a line with Anthea a little to the right, expanding its ruddy disc surrounded by fronds of the bright green sea-lettuce (*Ulva latissima*), is a strawberry; and how appropriate is the name when the animal is closed, embedded as it is in green. Next this, a little forward, is a fine parasitic anemone (*Sagartia parasitica*) with its decisive-looking head, stretching out a beautiful brown-dashed white star of countless rays, magically changing from bloom to bud, from bud to bloom. At the front, shadowed by the Ulva and rooted among the stones that it likes best, is a variety of the daisy anemone (*S. bellis*). I think it must be *Stellata*, as it is always frilled, never flat or coin-like. It is pale brown mottled with white, and has one deep brown tentacle very different from the rest. It sometimes erects a column 2 inches in height. The snowy anemone (*S. nivea*), too, so delicately white, blooms quietly near the base of a dark-coloured weed; but what is it that rises from among this same weed, so seemingly allied that (not being wiser) you might take it for its flower? It is a tube worm (*Sabella*), with a delicate spiral fan of feathers at the end of its tube, the base being firmly embedded in the sand. Upon the tube, close to the flower, a prawn every evening makes its stand, now and then in mere wantonness sailing or flashing from its resting-place and again returning and most unceremoniously disturbing Sabella, who does not at first like such rough behaviour, and forthwith retires, but by and by gets more reconciled to it, and even suffers its plumes to be ruffled by Mr. Prawn, who has doubtless learned that he may venture thus near with impunity, although I know his experience teaches him differently with regard to the anemones, as Anthea has had him by the antennæ, and he has had to lug and tug for his life, leaving a portion of those necessary organs with the enemy withal.

Although imperfectly described, this little aquarium is a perfect picture, with its base of sand crowned by rock and shingle intermingled with green and red weed (*Ulva* and *Griffithsia*), and brightened by the living beauty of the animals.

Now, let me say a few words about the animals I have in captivity,

A specimen of the handsome variety *smaragdina* of *A. cereus*, the "opelet,"—increased by fission. For three weeks prior to division it was exceedingly restless, much more so than usual—moving about the glass, and never during that period erecting a stem or column, but keeping the disc pressed close to the base, so that it was only ⅛ inch or less in thickness, and *always* keeping an elliptical or long oval form. At the end of that time the division took place. I did not actually see it, much to my regret, although I had been anxiously looking forward to it, being from home at the time. It split not quite across the middle, the larger part curling up and showing an indication of a mouth, the lesser part not showing any indication of one. Both portions, unfortunately, ultimately sloughed away.

Another interesting case of propagation, by rupture of the base, has occurred in one of my glasses. This time *S. venusta*, the orange disc, was the actor. It is a pretty specimen with a white centered disc surrounded by a ring of vivid orange, and having semi-pellucid white tentacles. It was situated upon the edge of a piece of rock, a station it had occupied since August 6th. On Saturday, December 5th, at 10 p.m., it had thrown out a lobe of the base over the angle of the rock, the lobe stretching about ¾ inch downward. On Sunday, December 6th, at 10 a.m., another lobe, exactly opposite, was stretched along the level surface of the rock, and the suckers at the end of this and the other lobe were attached firmly to the rock. The animal then began to pull itself strongly, but with an almost imperceptible movement, along the level surface, and by 11·30 had torn off from the base a small portion, about ¼ × ⅛ inch. This contained a number of acontia (nettling threads) which for some hours after were moving about, after which they were gradually drawn into the still shapeless fragment, the piece assuming the form (*i.e.*, the bud) of an anemone about two days after. It has since continually varied its form and size, but at present, by the aid of a pocket lens, I cannot discern tentacles. It has thrown out a nettling thread upon being annoyed. I may mention that the parent, when it came into my possession, was a poor wasted thing; but by regular feeding it has regained its beauty both of form and colour, being now a plump (and for a Birmingham anemone) healthy animal.

Several gems (*Bunodes gemmacea*) have been born in one of my glasses, one of them, the offspring of the pretty blush-pink variety, measured, when born,

¼ inch across the disc, with tentacles nearly ¼ inch long, by far the largest I have seen. It bears all the characteristics of its parent, which died soon after the young one was born. The young of this species have thriven better with me than the adults: is it because they were injured in obtaining them? Decay seemed to commence at the base, which usually showed a small puncture in the centre.

Daisies have been produced by scores. One has two discs. By the by, I have a very interesting *bellis* that does not appear to be named as a variety. It is wholly burnt umber* disc and tentacles. It has not produced young, although *tyriensis*, *stellata*, and two other varieties have all done so.

I have had the variety *brunnea* of *A. dianthus* with a perfectly-formed young one budding from the column close to the base, but the individual passed out of my possession after I had had it a few days.

Of the habits of some of the anemones a few words may be said. A very fine specimen of the scarlet-fringed anemone (*S. miniata*), with a disk 2 inches in diameter, usually when hungry throws out the interior circle of tentacles to a considerable length, and one or two to 2 inches or more, until they become so pale as to be nearly invisible. Food placed upon the tip of one of these elongated tentacles is instantly drawn towards the mouth; for *Miniata* is a gourmand, and ready for any food at all times and seasons. The Snake-locked anemone, *S. viduata*, in the evening extends its column to 5½ inches, from the summit of which its delicate "cloudy" tentacles droop gracefully over the little cave-dwelling anemones (*S. troglodytes*), spreading their little stars of mottled tentacles upon the surface of the shingle below. Others of the same species (*troglodytes*), one with an ochre disc and opaque white tentacles, and the black and white *melanolenca*, peer from their crannies in search of the food they prefer not to seek in the daylight.

A. dianthus, you will say, has a tolerably "capacious mouth," when I tell you that it swallowed a gravity ball half an inch in diameter; but not finding it so dainty a morsel as it supposed, was glad, after keeping it some hours, to give it up again. My experience of the *Sagartiadæ* is that they are free feeders, taking their food readily, and like to receive it regularly—say once a week,—all of them swallowing quickly. I give mine oyster, sole, or raw beef, and they seem to thrive well.

Anthea I cannot get to look well or live long, but I do not despair of doing so as I gain more experience.

All anemones after food repay the attention given them, spreading out their beautiful blooms among the seaweeds with such a persistency of beauty.

> "An emanation of the indwelling life,
> A visible token of the upholding love,
> That are the soul of this wide universe."

S. parasitica is a great feeder; almost any kind of food meets its palate, and it does not mind how often it receives it. The Vestlet (*Cereanthus Lloydii*) blooms in quiet beauty at the door of its glass house, through the windows of which you can see its vestments minus the sand. And so here, more than a hundred miles from the sea, I have some little rock-pools that for variety of life rival those of nature; for, as a friend of mine truly says, here "art improves upon nature," bringing together many rare and beautiful forms, that to be seen in their native haunts must be sought for far and wide.

G. Sherriff Tye.

Handsworth, Birmingham.

* Since writing this I have received a smaller one from Mr. King, of London. I think it is the same that is mentioned in Mr. P. H. Gosse's book on Anemones, as having been found by Mr. H. Owen, of Bristol, at Ilfracombe. My largest specimen came from the same place—"of a dark self colour chocolate or umber-brown."

LIGHT ATTRACTING INSECTS, &c.

In the last number of Science-Gossip a correspondent raises the question why many animals, especially insects, are attracted by light, particularly that of a candle or other flame. The idea has sometimes occurred to me, though it may appear rather a fanciful one, that possibly the insect might regard the flame as light shining from an aperture through which it might make its escape, somewhat as children imagine the stars to be pinholes in the sky. If a room were thoroughly darkened, with the exception of a small opening, such as a key-hole, through which the outer daylight was allowed to enter, such an aperture would appear from within, by contrast, almost as bright as the flame of a candle, and any winged insects enclosed in such room would be pretty certain to direct their flight to the opening. Moths in a room are probably under a sense of being lost and confined, and as bees hurry up and down the window, so nocturnal lepidoptera knock against the ceiling, or dash into the candle-flame, perhaps equally with the impulse to escape.

Insects seem to be under a fixed impression that the direction of the light is "the way out." An uncorked vial may be almost filled with flies if it is laid on the table with the mouth turned away from the window, the idea of a back exit being apparently beyond their capacity, but let the position of the vial be reversed, and in a few seconds it will be tenantless. In collecting provisions for the frogs, &c., in my vivarium, a long test tube is often used for the reception of flies, and after the tube has been laid down, and the insects collected at one end, I have often been amused on reversing it at the steady procession that takes place to the opposite extremity, where the incarcerated insects struggle and thrust

one another like the crowd assembled at the entrance to some popular entertainment. Owls and bats living in dark recesses, such as hollow trees and caves, are probably guided to the entrance by such light as the dusky eve affords, and which is doubtless much more luminous to their visual organs than to ours; but if they also rush to a flame with the intent to escape, probably their senses are dazzled and confused by a light stronger than they are accustomed to, as an ordinary flame scarcely represents an opening large enough for their passage. With regard to bats, however, I have not observed in them any great predilection for singeing their wings; at least, the Pipestrelle and Long-eared Bat, which occasionally enter our apartments on summer evenings, appear to fly as near as they can to the ceiling, especially hovering in the corners. A Serotine Bat, too, which I had some years ago, and used to let loose in the house in the evening, flew backwards and forwards in a passage without interfering with the light. When scared from sleep, however, by the entrance of torches into their dark cave or other hiding-place, they are said to dash wildly at the light, possibly in making for the entrance.

If, however, winged creatures may in alarm mistake a light for an exit, I do not imagine such can be the case with fish, which throng to a torch: imprisoned moths and free and independent salmon are very differently circumstanced. Curiosity, or some such motive, would seem to draw fish towards a luminous object, which must be a rare phenomenon in their eyes.

It should not, however, be forgotten that it is not all the animal creation that are attracted by a flame. Passing by those animals which appear to be indifferent to the matter, many—as, for instance, the large carnivora—regard it as an object of dread. It is not with a view of attracting lions or tigers that travellers kindle fires round their bivouac; these powerful and daring animals slinking from the flames into which the wretched insects cast themselves as if in a frenzy of delight—somewhat as I read to-day of the burning of a lunatic asylum in America, where the poor insane creatures that were saved danced in ecstasy at the roaring flames and crackling timbers.

A few years ago a graphic account was published in some periodical of a visit to the Zoological Gardens by night, with a vivid description of the terror exhibited by the large carnivorous animals when a light was brought in front of their dens;—they were rendered almost frantic, and their roarings and howlings continued long after the source of alarm was withdrawn.

Other animals besides the beast of prey seem to be affected with the same dread; as in ancient times, when elephants were employed in war, it is said that the Romans discovered fire to be the best means of repelling these attacks: possibly about this time they invented the Roman candles.

In connection with this subject, I would remark that the influence of certain colours on particular animals would be an interesting matter for investigation, and one that does not appear to have been much followed up. As far as I am aware, red is the only colour that is reputed to be held in antipathy by some animals, and its resemblance to the colour of fire is worthy of notice. If this resemblance has anything to do with the matter, the Felidæ might be expected to show an abhorrence of the colour; but the constant succession of various coloured dresses before their dens would probably extinguish such a feeling in caged specimens, if it ever existed. Bulls, turkeys, and geese are commonly believed to exhibit a strong antipathy to anything red. In dealing with a savage bull, some caution is desirable; but if any of your correspondents like to try experiments on that animal, I should be happy to read the results. Any one who has turkeys or geese in their poultry-yard might test them with different colours, and if they show fear or dislike, might ascertain what tint produced the greatest effect—whether a flame colour, for example, has more influence than scarlet. This is rather a digression from the original question; but I am not at all certain that the two subjects are wholly unconnected.

GEORGE GUYON.

Ventnor, Isle of Wight.

BUTTERFLIES TO THE RESCUE!

WE all know that enthusiasm is a good thing if exerted in a good cause, and, indeed, to a naturalist some proportion of it is absolutely necessary to secure success. Like some other good things, however, it is possible to have too much of it; or rather, to be more exact, it is very possible to be led by it unconsciously into the committal of errors which seem to arise almost naturally from the onflow of commendable earnestness, but which, being really divarications, we should guard against. A collector of natural objects who has no enthusiasm had better lay aside his implements and look out for some other pursuit; but if he has enthusiasm, he needs to be cautious lest he should defeat his own ends, and furnish an apt and modern illustration of the truth set forth by the old fable about a certain goose which laid golden eggs.

This time of the year is a dull season with the butterfly-collector. Now he sits and ruminates over the captures of the past, and calls up imaginings of captures yet to come. His pins, "once a shining store," stick useless in the cushion, dust accumulates on his setting-boards, and his nets hang melancholy against the wall, or are dragged down and brandished about by a party of juveniles who have invaded his *sanctum*. Let him bethink him-

self, whether he has not sometimes been too hasty and excessive in the slaughter he has committed amongst his favourites. A butterfly-catcher should be a butterfly-lover, and if he is really gladdened by the sight of these insects recreating themselves in the sunshine or the shady dell, he will avoid unnecessarily thinning their numbers. We speak of hasty and excessive slaughter—we see occurring too many instances of each. To catch a butterfly, to kill it without examining its appearance, and then to throw it away because it is rubbed, bespeaks an unjustifiable carelessness. The needless accumulation of a large number of specimens of each species (useless in cases of varieties) is a foible which, to say the least, is not one of the indulgences of which the entomologist can be proud. We have heard of a collector whose "series" was "three rows" of each insect! And, for the sake of exchanging to advantage, both butterflies and moths have been swept down by the hundred when a collector came upon a metropolis of some valued species. Whatever may be said in favour of the practice of exchange—and that much may be said I do not doubt—*this* certainly may be urged on the other side, that it has a tendency to occasion the destruction of species. I could not but read, therefore, with regret that a society had been formed for the express purpose of facilitating exchanges, and the correspondents thereof are recommended to "send as many of each species as possible." Great might be the lamentation in the woodland glades were the visions of the past really true, and the "children of the sun" endued with some measure of human insight and knowledge. For the wholesale slaughter of butterflies has a more immediate tendency to extinguish or diminish a species than the same practice carried on amongst the moth tribes. We have but a very small allotment of British butterflies, and it is easy to see that out of this number some are likely in a few years to become extinct, or at least exceedingly scarce. There are other causes at work here, undoubtedly, besides the collectors: a great deal of beautiful country around our towns is becoming rapidly absorbed by the needs of a growing population, and common and wood suddenly disappear that land may be rendered arable and food-producing. Many of our butterflies are so very local that a destruction of their food-plant in a few spots, or the capture of a large number by collectors, will go far towards making the species die out. Unfavourable seasons, also, have a greater effect upon butterflies than upon moths. They are certainly partially protected by the circumstance that their *larvæ* are usually difficult to find; were it not so, some species would fare still worse than they do now. I appeal to all who hope to be butterfly-collectors in the coming season, and ask them in the case of rare or local species to avoid all needless destruction. C.

NEW VINE DISEASES.

IN the month of June, 1863, I received from Hammersmith a Vine-leaf covered with minute gall-like excrescences, "each containing," in the words of my correspondent, "a multitude of eggs, and some perfect Acari, which seem to spring from them, and sometimes a curiously corrugated Coccus." A microscopical examination of these objects soon revealed the fact that the excrescences were galls of a peculiar character, caused by the irritation from the sucking of the leaf by the full-grown insect enclosed within the gall (which was partially opened on its upper surface)—that the insect itself belonged to the family Aphidæ, and not to the Coccidæ (or at least that it was intermediate in character between the types of the two families)—that the eggs were those of the perfect insect itself, which had formed the gall in which it had enclosed itself as in a living tomb, and that the perfect "Acari" were minute young, hatched from these eggs. The information thus gained was, however, zoologically incomplete, from the want of a knowledge of the male insect, which doubtless is winged, and which would have enabled me more satisfactorily to have determined the situation of the insect in the system. Hence, with multitudes of other semi-complete observations, the matter remained unpublished in my portfolio.

In the autumn of 1867, and during the past year, my attention has, however, been several times directed to the same insect, which appears to have become extensively disseminated, and has exhibited its powers of mischief in a most unlooked-for manner, since not only have I received further specimens of the Vine-leaves infested in the manner above mentioned, but have had portions of the roots of Vines sent to me from different quarters, the rootlets of which had been sucked by a wingless insect, which I cannot in any manner distinguish from those of the galls on the leaves. From Cheshire I received in September, 1867, leaves from a young Vine, growing with twenty-five others in a house seventy-two feet long, in which it was the only one attacked, having previously made fourteen feet of wood since it was planted in the February preceding, the insects being only found in the young leaves within five feet of the top. In the following month the same correspondent sent rootlets from his Vines, attacked by the same insect, and I have since received it from other correspondents in different parts of England, as well as Ireland. In the latter mode of attack the perfect insect makes a wound in the delicate rootlet, by inserting its rostrum into the wood, and sometimes this is so firmly imbedded as to remain in its position when the insect is removed by the hand; decay is thus induced, which "penetrates in the form of little cankerous spots, and sometimes extends

to the centre, cutting off the supply of nourishment."

In the spring of last year I communicated a notice of this insect to the Ashmolean Society of Oxford, accompanied by highly magnified drawings, which are reduced in the accompanying woodcut, when I proposed to name the insect *Peritymbia vitisana*, in allusion to the tomb-like gall on the leaves formed by the female insect.

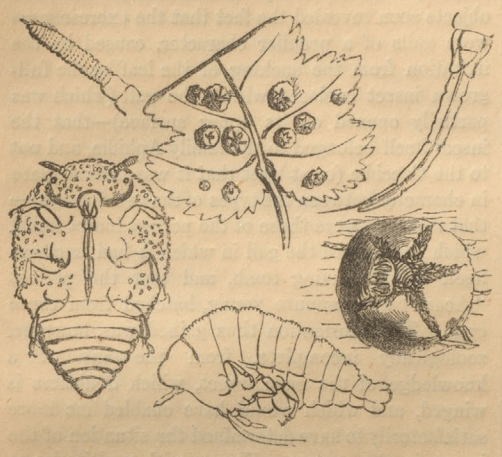


Fig. 42. Vine Insects (magnified).

In France, where the culture of the Vine is of much more popular importance than in England, the disease has manifested itself with great virulence. The manner in which it appears in that country, and the various erroneous opinions which had been formed as to its origin, are noticed in one of your leading articles of the 31st of last October, together with a statement of the examination of the subject made by a commission, at the head of which was M. Planchon, which resulted in the disease being referred to the presence of the insect now under consideration, to which the name of *Rhizaphis vastatrix* was applied, a name, as "M. J. B." well observes, "scarcely applicable, should it turn out, as we suspect will be the case, to be congeneric with the very similar insect which is found in the excrescences on Vine-leaves."

At the meeting of the Entomological Society of France on the 12th of last August, M. Lichtenstein communicated a notice of the ravages of the insect, which was stated to destroy the Vines only on the left bank of the Rhine, from Arles to Orange, together with a notice of M. Planchon's observations, and with the remark that M. Signoret, the distinguished entomologist of Paris (whose attention has for some years past been devoted to the Coccidæ and allied insects), considered that the insect belongs to the genus Phylloxera. It does not appear, however (although the latter generic name might indicate such a connection), that the entomologists either on the Continent or in America* connect the ravages of the Vine-leaf gall aphis with that of the root insect.

The engraving represents, in the middle of its upper part, a portion of the upper side of part of a Vine-leaf greatly reduced in size, with a number of the gall-like excrescences, also slightly reduced. These excrescences are thickened portions of the leaf, the underside of each being swollen into a convex shape and entire, the female insect being enclosed within the cell thus formed, the upper surface of the leaf throwing out or splitting into triangular portions, as represented in the right-hand figure, the edges of each portion emitting a number of delicate white filaments. The extremity of one of these portions is turned back in the right-hand figure, showing part of the body of the female within the gall, surrounded by its eggs. The full-grown insect itself (which is scarcely half a line, or 1-30th of an inch in length) is represented on its ventral surface in the left-hand figure. Seen under a high-powered lens, the whole body is swollen and fleshy, and is covered with minute granulations: the eyes are distinct, minute, and ocelli-like; the antennæ are short, composed of only two very small basal joints and a longer apical one, having apparently a very minute setiferous tubercle at its extremity: the long joint appears under the microscope to be formed of a great number of very short rings. The sucker is distinct and four-jointed, varying in length according to the size of different individuals: as usual in hemipterous insects, it encloses several very slender setæ. The legs are of moderate length, with the tarsus formed of a short basal joint, which on its inner edge emits two short setæ, whilst the terminal joint is longer and slightly thickened at its extremity, which is distinctly furnished with two claws. The abdominal portion of the body is comparatively small and eight-jointed. The figure on the left-hand side of the engraving represents a female taken from the leaf-gall, whilst that in the middle of the lower part represents one of the females from the root of the Vine, seen sideways. Amongst the latter were some specimens which had a small black shining lobe on each side of the body, probably the rudimental wings of the male insect.—I. O. W., *in Gardeners' Chronicle*, January 30.

The Mole Cricket (*Gryllotalpa vulgaris*).—In Curtis' British Entomology I find the following: "This insect is supposed to be the 'Will o' the Wisp,' the *Ignis fatuus*, about which so much has been said, and so little proved, the phantom that has eluded the vigilance of the naturalist and the curious for ages!" Can any of your readers indicate upon what grounds this supposition is based?—*E. M.*

A NEW SURIRELLA.

IN the early part of last spring my attention was called to a form of Surirella occurring in a slide sent to me by Dr. Capron, of Shere (Surrey); but as it was scarce in the small gathering he had made, I was inclined to consider it an abnormal state of *S. splendida*. Some months afterwards I received from my friend, M. de Brebisson, a small quantity of a gathering made by him at Falaise, in which the form I am about to describe was common, and when I called his attention to it he pronounced it to be a new species, and suggested that it should be called *S. cornigera*, or *Capronii* ("Je penserais, plutôt, que serait une espèce nouvelle que vous pourriez appeler *cornigera* ou Capronii, comme vous jugeriez le plus convenable").

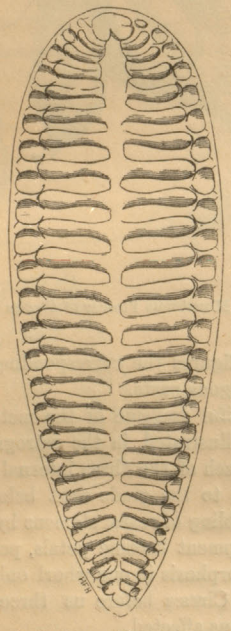


Fig. 43. *Surirella Capronii*, Falaise variety, × 300.

This species does not differ from *S. splendida* in size, outline, or canaliculi, but differs from that, and all other species of Surirella, in possessing one or more horns, or processes, springing from the longitudinal median line, of which they appear to be a prolongation. Some little distance from the apices of the valve the nipple-like process has a short spine on the apex. A careful examination of the under-surface of the valve shows that the process is hollow, but I have not been able to satisfy myself that the spine is tubular; the process near the narrow end is smaller than that at the broad end of the valve, and points in an opposite direction. The French species differs from ours in possessing only one process (Dr. Capron informs me he has detected some valves with two), and is not quite so large.

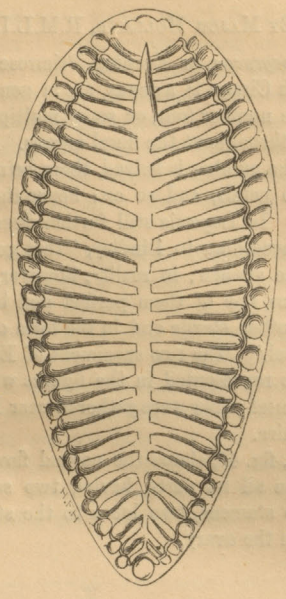


Fig. 44. *Surirella Capronii*, from Shere, × 300.

Surirella Capronii, n. sp. F. K.—Valve ovate, elongated, alæ conspicuous, canaliculi distinct (3½ to 4 in. ·001), reaching median line, valve with one or

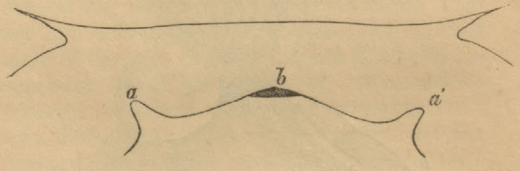


Fig. 45. Ideal (longitudinal) section of valve, and transverse section of valve (central portion).
a, *a'*, alæ; *b*, longitudinal median line or ridge.

two spurious processes proceeding from the longitudinal median line. Fresh water; Shere, Dr. Capron; Falaise, M. de Brebisson.*

F. Kitton.

Microscopic Societies' Soirees.—The Annual Soirée of the Old Change Microscopical Society was held with great success on the 15th of February. That of the Quekett Microscopical Club is announced for the 12th of March, at University College, Gower Street.

---

* I have great pleasure in naming it after Dr. Capron, whose name is well known to the students of the "Synopsis of British Diatomaceæ;" he is, moreover, the discoverer of the species.

ENCHANTER'S NIGHTSHADE.

Circæa Lutetiana.

By MAJOR HOLLAND, R.M.L.I.

THE *Onagraceæ*, or Evening Primrose Order, of which Circæa is a genus, are in general tetramerous, the number four, or some multiple thereof, prevailing throughout the floral organs. In Circæa, however, the number is halved, there being but two sepals, two petals, and so on: hence the plant is distichous. In Lopæzia still further degradation is exhibited according to Lindley, "that genus showing but one stamen; in reality, however, there are two stamens, one of them perfect and bearing another, the other sterile and in the form of a spoon-shaped petal." The two specimens of Enchanter's Nightshade represented in the figures which illustrate this brief paper were gathered near Ivy-bridge in Devonshire.

The first, fig. 46, shows the normal flower, which is binary in all its parts, having two sepals, two petals, two stamens, two lobes to the stigma, and two cells in the ovary.

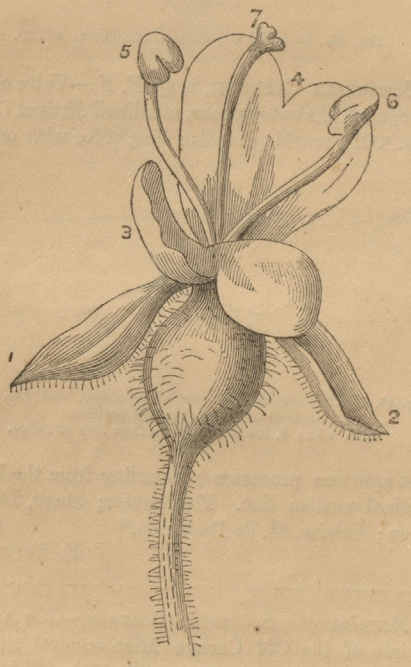


Fig. 46. Normal Flower of *Circæa Lutetiana*.

In the second, fig. 47, we have an abnormal or monstrous flower; a portion of the stigma is transformed into the anther of a stamen, and one of the stamens assumes the character of a petal, while in the place of one of the petals we have two distinct sepals: thus four distinct sepals are displayed instead of two. This instructive monstrosity seems to disclose a tendency in Circæa to revert to the tetramerous type. In the normal flower each of the two deeply-cleft petals appears to be formed by the coalescence of two coralline leaves, but there are only two sepals, and they present no corresponding indications of coalescence.

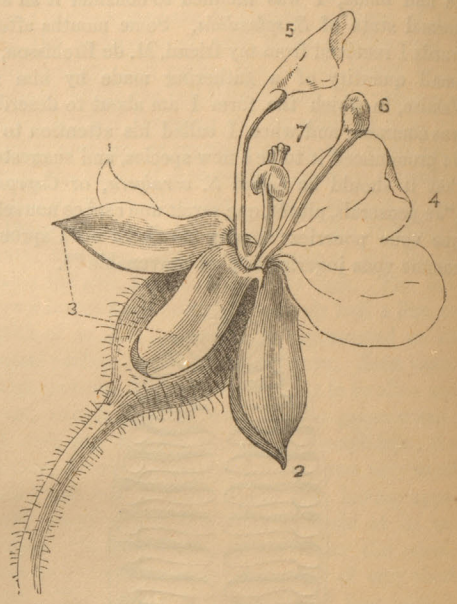


Fig. 47. Monstrous Flower of *Circæa Lutetiana*.

In the two figures the corresponding numbers express homologous parts.

The beautiful doctrine of the metamorphosis of the leaf is illustrated in the retrogression of one member of each of the three internal whorls of the floral organs to the grade next below it. In the common doubling of roses, stamens by simple retrograde development become petals, perhaps displaying a metamorphosis in one whorl only; but in the specimen of Circæa before us three of the floral organs are thus affected.

On comparing the monstrous with the normal flower, we find one lobe of the stigma converted into an anther, one of the anthers into a petal, and one of the petals into two distinct sepals (3), the latter further affording undeniable proof of the composite structure of the normal petal, otherwise indicated by its emargination.

I was not aware until after I had written these few lines on this interesting subject that the late Professor Edward Forbes, to whom the original specimens from which these drawings were made were presented, was so much struck by the lessons they conveyed that he caused diagrams to be prepared from them for the botanical classes of King's College.

Bury Cross, Gosport. J. Y. H.

A LITTLE FROG.

WHEN riding one day over the Flats, about ten miles from Cape Town, we were passing near the edge of a lake where the heath and bush were rather high, and the ground swampy; a small frog jumped on to one of our horses. As it was a rare kind which I had never seen before, we caught it, tied it in a handkerchief, and carried it home. It was of a very peculiar delicate cream colour, sometimes appearing almost gilded, and at other times of a duller pinkish hue; there was a darker stripe from the eyes down each side. The eyes very large, bright, and prominent, the feet formed like those of the tree frogs, the toes being of a bright orange red colour; the body was little more than an inch in length, and so transparent that it was always easy to see if he had had his dinner or

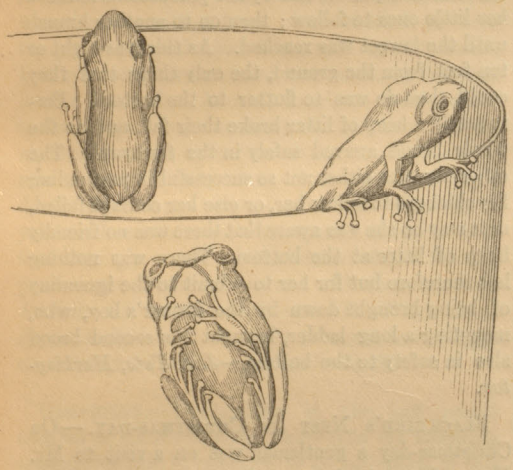


Fig. 48. Cape Frogs in a tumbler.

not. The hind legs were very long, enabling it to jump a considerable distance. I placed it in a tumbler with a little water at the bottom, and after a few days I was intending to let it go, not knowing what to feed it on, when suddenly it sprang on to a newspaper after a fly; seeing this I resolved to keep it, and if possible to bring it with me to England. I used to let it loose in the room, and often it would spend hours sitting on the window, generally preferring the glass to the woodwork. It never willingly went into the water, but I often refreshed it with a bath. It was only after some time, by most careful watching, that we discovered the mode by which the prey was caught: it appeared as if the flies walked into its mouth by some sort of fatal fascination exercised over them; but on its trying to catch flies on a painted post, while sitting on my hand its tongue adhered so tightly, that I had then time to see that it was by darting out a broad, irregularly shaped, and very sticky tongue under the flies, that he managed to catch them. Flies were its favourite food, but sometimes a small spider would fall a victim. In cold weather it would remain sitting on the side of the tumbler, and would refuse all food for many days together, but in warmer weather it would become much more active and eager for food, generally three or four flies would satisfy it, but sometimes it would take as many as eight if they were of a small size; they were all swallowed whole.

I never saw any sign of its changing its skin, and never heard it make any noise. It appeared quite tame and would jump all over me, and feed from my hand. Having never seen any description of this kind of frog in Natural History books, I have not been able to discover its name, and should be much obliged if you or any of your readers could enlighten me. As it was the only one that I ever saw, I believe it to be a rare and certainly a very beautiful little frog. After keeping it for nearly a year, it escaped and I never saw it again.

M. F. D.

The Oak-feeding Silkworm (*Bombyx Yamamai*).—On May 17th I received two or three dozen eggs of this new silkworm; and in about an hour after they arrived, my first caterpillar was hatched, and put on oak leaves. On the following day, six more came out; but unfortunately I lost two of them as they wandered away from the leaves. I did not care much about it at the time, as I expected more of the eggs to hatch; but in this I was disappointed, for no more came out. When about a fortnight old, one of them turned rather black, and soon died; another fell into the water, and was drowned; so that my stock was reduced to three caterpillars, and these did well all through their stages. They grew fast, were a beautiful bright green colour, with white spots on their sides, like diamonds; and being quite new in this country, were objects of great interest to myself and numerous friends. On July 10th, two of them began to spin up. They seem to be very irritable at this time, and jerk about violently if the branches are touched. The third caterpillar continued eating till the 22nd. The cocoon is much larger, and more exposed than that of the Ailanthus. It is a bright yellow. On Sept. 3rd, the first moth came out—a beautiful creature, of a rich brown colour, measuring 7 inches across from wing to wing; and wishing to keep it in good order for my cabinet, I took its life on the third day, as there seemed no prospect of more. On the 8th, another came out, and laid nine eggs. The other did not come out till the 18th of September, so that I had no chance of pairing them. I hope to get some more eggs this year.—*S. B.*

ZOOLOGY.

IANTHINA, THE VIOLET SEA-SNAIL. — In the paper on this creature which appeared in the last number of SCIENCE-GOSSIP the references to the engravings have been accidentally misplaced. In each instance the reference has been placed at the end of the paragraph immediately preceding that which the drawing referred to serves to illustrate, instead of being put at the commencement of the papagraph connected with the illustration. Thus in page 31, the reference (fig. 17) at the end of the third paragraph requires to be neatly erased with a fine pen, and written at the beginning of the next, immediately before the word "This." In the same way all the remaining references throughout the article require to be moved from their positions at the end of each paragraph to the commencement of the very next line of the text. Readers interested in the subject will not grumble at making these alterations, which are necessary, and change the meaning of every illustration.—*J. Y. H., Bury Cross, Gosport.*

THE CUCKOO.—In addition to the communications of "E. G. W." and other correspondents, I venture to send a few more facts respecting the Cuckoo. W. Jerdan, at one time editor of the *Literary Gazette*, once took a young Cuckoo from a Hedge-Sparrow's nest, and kept it some months. It grew quite tame, and would sit on a branch while he dug worms for it. It apparently was choked one day. The Cuckoo seems to feed almost entirely upon worms, insects, and caterpillars, although it seems occasionally to eat berries and seeds. A Cuckoo was once placed in a Canary's cage; caterpillars were placed also in the cage, and curiously the Canary fed the Cuckoo with the caterpillars, while it ate the seeds itself. The Cuckoo seems, according to some observers, to lay more than one egg—some say five; and if so, must place them in different nests, and to do this it appears to use its bill when the nest is so placed that it cannot get at it otherwise. On one occasion a Cuckoo was seen anxiously watching a pair of Wagtails building their nest. This did not seem to go on so fast as was necessary, for the Cuckoo laid its egg before the nest was finished. The same observer saw one enter a Wagtail's nest, take an egg out, and leave its own in. Two eggs have been occasionally found in the same nest. The Cuckoo seems to place its eggs in a variety of nests, Wren's, Wagtail's, Robin's, Yellow-hammer's, Linnet's, as well as Sparrow's nests—all seem used. A Wren has been known to leave its own egg to feed a young Cuckoo in a cage. It got to it through a broken pane in the window. A Robin has been known to hatch and nurture the Cuckoo with the greatest care. The Cuckoo does not seem to be the only bird which palms its eggs upon others, as Wilson says that the Cow-bunting of America lays its eggs in other nests, such as the Wren, the Chiffchaff, and the Redstart. These I have taken as interesting notices from a great many others from Loudon's magazine, which every one may not possess.—*E. T. Scott.*

SINGULAR PLACE FOR A HEN'S NEST. — A few miles from this place a farm-house stands in the midst of a rookery. During the summer of 1867, two hens made choice of the deserted nests of two rooks wherein to lay their eggs, and to rear their young. When the chickens were hatched, there arose the difficulty of bringing the little ones to the ground. This was successfully accomplished by one of the hens in the following manner: she first hopped upon a lower branch of the tree than that in which the nest was placed, and by her persuasions induced her little ones to follow; then on to another branch until the lowest was reached. As this was eight or ten feet from the ground, the only thing that they could then do was to flutter to the bottom. Fortunately a heap of litter broke their fall, and so the whole brood arrived safely in the farmyard. The other hen was either not so successful in persuading her chickens to follow her, or else her courage failed, or it may be she was aware that there was no friendly heap of litter at the bottom. There was nothing left therefore but for her to submit to the ignominy of being brought down by the farmer's boy, who, mounting a long ladder, brought the second brood also in safety to the bottom.—*J. S. Tute, Markington.*

BLACKBIRD'S NEST ON CHRISTMAS-DAY. — On Christmas-day a gentleman was on a visit to Mr. Henry Herrin's farm at Spennell, near Kidderminster, and in looking round the farm, amongst other things discovered a Blackbird's nest with two eggs in, next day another egg was added, and the old birds are now sitting on five eggs.—*Birmingham Daily Post*, January 20th.

LAND-SHELL IN THE COAL STRATA. — A friend some time back brought to me some exceedingly handsome specimens, with impressions of ferns upon them of many species, obtained from a cutting of a new railway at Silverdale, North Staffordshire. One small specimen is rather noteworthy from certain little spiral shells, or rather their casts, which are to be seen on the fern-leaves (*Neuropteris*). These are about the size of the little Spirorbis or Microconchus, so well known as occurring in the coal-strata, rarely if ever, I think, on ferns, but usually on the surface of the shale or indurated mud, and sometimes, as I have seen, on bivalve shells (*Anthraconya*). The difference of habitat, and a more rapid increase in diameter of the whorl in

the little shell found on the fern-leaves lead me to suppose that it is a *Zonites*, which is a pulmonate or air-breathing gasteropode, and which species has not, I think, been previously found in Great Britain, fossil in the coal-measures.—*R. G.*

Entomology in the Coal-pits.—There is more natural history in mines than people imagine. A few months ago a friend, employed underground, brought me a beautiful beetle caught in the pit, and which I have only once or twice met with above ground. It was a fine specimen of *Astynomus ædilis*, a beetle with extremely long antennæ, well known to collectors, but not "as plentiful as blackberries." Two other friends during the last summer have sent me numerous specimens of Sirex, the great *S. gigas* and the smaller *S. juvencus*. These *hornets*, as they called them, had seriously frightened the colliers. No doubt the pine timber which was used for props in the pits was full of the larvæ of these insects, as was the case with a large block which I got near the pit mouth, and which I had split up to examine. I think last year the Sirex was unusually frequent in our fir woods. Another longicorn beetle, allied to the Astynomus, was lately brought in to me by my neighbour the timber-merchant; its antennæ were also of great length, nearly three inches; it is no doubt *Monochamus sutor*, the cobbler. Can any of your readers inform me what species of insect it is that cuts pieces out of the leaves of the floating pond-weeds (*Potamogeton*), and with them makes a domicile for its larvæ (*Donacia?*)? What insect deposits clusters of regularly arranged brown eggs on water-grass or *Poa aquatica?*—*R. G.*

Geophilus.—Taschenberg in the last issued number of his *Wirbellosen Thiere* tells the following remarkable tale in reference to an individual of this genus. "In a medical journal published at Metz, Herr Scoutetten states that a woman, 28 years of age, residing near that city, suffered for some months an uncomfortable tickling sensation in the region of the nose, accompanied by a copious discharge from the nostrils and frequent headaches. The symptoms gradually became worse; the pains extended from the nose to the ear, and then over the whole head. The agony endured by the patient was frightful: it was as though her head was being struck at regular intervals by a hammer, or as if her forehead was being bored through; and often she became delirious, and rushed madly about the house in her vain efforts to find relief. At length after these attacks had continued during a whole year, they were suddenly brought to a close in a most unexpected manner. During an unusually violent fit of sneezing, a living insect was ejected from the nose, which forthwith rolled itself up in a spiral fashion, like a watch spring. It lived some time in water, but quickly died on being immersed in alcohol. The insect was two inches long, of a yellow colour, and was divided into sixty-four segments, each of which bore a pair of legs. It was evident that it belonged to the genus *Geophilus;* competent judges pronounced it to be *G. electricus;* it is certainly either that or its near relative *G. carpophilus*. No suggestion has been offered as to the manner in which this centipede could have entered its temporary lodging."—*W. W. S.*

The Cuckoo in Captivity.—As "E. G. W." appears to think that no young Cuckoo has been kept in captivity longer than April 1st, the following notes upon one which lived from June, 1867, until June, 1868, may be interesting to him: it is taken from the *Quarterly Magazine of the High Wycombe Natural History Society*, vol. i. pp. 189-90. "This bird was taken in a half-fledged state from the nest of a hedge-sparrow, early in the month of June. The first food provided for him was a boiled egg, which pleased his juvenile palate—bruised seeds and soaked bread were also given to him. After a few days, worms and raw meat were offered. These provisions were greedily swallowed, though for some time he declined the trouble of feeding himself. During the severe weather, when worms could not be procured, raw meat was preferred; but cooked meat, vegetables, bread-and-butter, indeed, almost anything was devoured. On Christmas day he dined off turkey and plum-pudding. Hot buttered crumpet is a favourite dish. The bird is extremely tame, the feeling of fear towards any of the household seeming quite unknown. . . . . Whenever a clatter of plates is heard in the kitchen, an answering note is heard from the cage. The cuckoo descends from his perch, and, should the door be closed, knocks his head against it until a friendly hand attends to his wishes. His eating is not confined to regular meal-times, but he is stuffing all day long: probably the reason so few have lived is that they have never had enough given them to eat. The struggle of instinct at the usual time of departure spoiled his beauty. At night he was constantly found with his wings spread, beating against his cage; darkening the cage did not prevent it: the feathers of his long wings and tail were all broken. The hero of this account became gradually more and more domesticated, and was allowed to wander at will about the premises; his health was apparently unimpaired, although he became almost featherless; but, on June 8th, the joint appearance of a strange cat and disappearance of the cuckoo left little doubt as to his untimely end."—*B.*

Blackcaps.—While out on the 21st of January, my companion shot a cock-blackcap; we also saw a bird with it, which I supposed to be the hen. Is it not strange to see Blackcaps paired at this time of the year, and also to see them in England during the winter?—*Forbes Jenkins.*

BOTANY.

FERNS.—The twelfth volume of the *Gardener's Magazine* commences with the new year, and the first monthly part contains fourteen excellent woodcuts of species of Adiantum, illustrative of consecutive papers on that genus. The part contains, besides, a mass of useful information on garden matters.

GALL-BEARING PLANTS.—A second list of British Gall-bearing plants is published in the *Entomologist's Monthly Magazine* for February.

THE SPECIFIC DIFFERENCES BETWEEN *Potentilla tormentilla* and *P. reptans*.—I hope Mrs. Watney will pardon me for saying that I am afraid the diagnoses of these two plants, as given by her in the last number of SCIENCE-GOSSIP—in fact, any descriptions taken from existing botanical works—are not yet sufficiently definite to enable us, at once, to draw a line between the two species; and that the query respecting them in "B.'s" excellent article, "Why," remains still, in point of fact, unanswered; for the very nature of the question shows that doubts had arisen in the writer's mind whether the differences already recognized and described in books were sufficient to justify the separation of them into two species. The characters which Mrs. Watney gives are, no doubt, quite sufficient to distinguish the two *extreme* forms from one another: indeed, they are so very different in size, in the shape and size of the flower, in the appearance of the *radical* leaves especially, and in the situations in which they are found, that they are known at a glance; and, seeing only these extreme forms, one would scarcely dream of snspecting that they *could* be anything but specifically distinct. But no sooner do we try to write down the distinctions on paper than our difficulties begin. Mrs. Watney herself observes that we often find *tormentilla* with five petals, and *reptans* sometimes with only four. She further says, "*Potentilla tormentilla* has an ascending dichotomous stem." This character, however, is by no means constant; and Babington himself describes the stem as "procumbent *or* ascending," putting the procumbent character first. Again, "*P. tormentilla* has ternate leaves." The lower leaves, however, of *P. tormentitla* are, according to Babington, quinate, like those of *reptans*, and I know that when the plant becomes luxuriant, growing somewhere else than on dry heaths, the upper leaves even become sometimes quinate, and stalked instead of sessile. The characters of these two plants differ much in different places, and probably Mrs. Watney has no difficulty in distinguishing them in her neighbourhood; but where I live they are the most perplexing plants I know, and I can at any time during the summer gather specimens that I am quite unable to refer positively to either species. I find large round flowers on the hedge-banks, apparently of *reptans;* but when I come to gather them, they have the small, often ternate foliage of *tormentilla;* and I find small square flowers of what appear to be *tormentilla*, but when I pull the plant up, it is rooting at the joints, like *reptans;* in short, we have every conceivable intermediate form; and the only conclusions I have hitherto been able to arrive at are that either they are not true species, or that they hybridize very readily, or that some fixed character has still to be found by which they may be distinguished.—*Robert Holland.*

SCOLOPENDRUM CATERACH.—"Davis's Botanology," 8vo., 1813, p. 99, says this fern was fast disappearing about Holyhead, being used as bait for rock codfish. Can any one inform me how it is used?—*S. M. P.*

"SCURVY-GRASS" (p. 43).—In my edition of Hooker & Arnott's "British Flora," published in 1850 (*sixth* edition), the *Cochlearia officinalis* is said to be an annual or perennial.—*S. M. P*

ALDER LEAF-BUDS.—I have perused Mr. Hepworth's paper on leaf-buds, in your February number, with much interest; however, he makes but little allusion to the Alder (*Alnus glutinosa*). This tree, to my thinking, has the most beautiful of leaf-buds; they are of a rich purplish-red colour, and in general outline not unlike the White Beam, but are considerably longer, and much thicker at the extremity. In March, before the buds are expanded, this tree presents a striking appearance, with the brownish catkins waving in the wind, and is then perhaps the most beautiful of our indigenous trees.—*J. F. Robinson.*

THE SHAMROCK.—As the 17th of March—the day dedicated to Ireland's patron saint—is approaching, I might perhaps be allowed to mention, that in the oft-renewed discussion as to what plant is the true shamrock, there has been no mention of *Trifolium minus;* at any rate, I have not seen this species alluded to in connexion with the Shamrock. The Celtic portion of the population are enthusiastic, here as elsewhere, in honouring their saint's day, and in displaying the national emblem on their persons on that anniversary; but I have never seen any plant worn as the Shamrock but *Trifolium minus*. I can only speak for this end of the island; but if they do wear the *Trifolium repens* generally over the country, as is stated, we northerners ought to take some credit to ourselves for superior taste. Any one who compares the foliage of these two trefoils, will see that the *T. minus* is much the more elegant plant. I should like to know if *T. repens* is really *the* plant worn in the south and west of Ireland.—*S. A. S., Belfast.*

Utricularia vulgaris.—The round, seed-like terminal buds of these plants, that have been lying dormant at the bottom of ponds during the winter, are now about to rise to the surface to shoot out into leaves and branches. Probably, as it has been a mild winter, many have resumed their vitality, and are, by this time, already floating at the surface. Where the Bladderwort is known to grow, the buds may easily be collected by drawing a light net through the water, sweeping it along the surface of the mud at the bottom. The buds should be well rinsed in clear water, when they form beautiful objects for the aquarium. I have kept eight or ten buds through the winter, and they are now beginning to grow. One of them rose to the surface very early, and is already several inches long, and has thrown out a side branch. The bladders are as yet so small as to be scarcely seen with the naked eye: no doubt, they are large enough to support the plant in its present small state; and they will be developed larger and larger as the plant increases in size and weight. I should be greatly obliged to any correspondent who would kindly send me a few buds of either *U. neglecta* or *U. intermedia*. I think they would come safely in a letter, if stuffed into a quill with the ends plugged with damp moss.—*Robert O. Colland.*

Scurvy-grass.—The Scurvy-grass (*Cochlearia officinalis*) is certainly an annual. I wish your correspondent would just try the experiment by cultivating some plants from seeds. Sow the seeds in July, in drills, and thin out the young shoots, leaving at least six inches between every one of them. He will find the leaves fit for use in the following spring; and they really are not a disagreeable addition to an early salad, though they give an unpleasant flavour to the flesh of different animals that feed on them. It is an often-noticed fact that the *Cochlearia officinalis* is found most abundant in those high altitudes where the dreadful evil for the cure of which it has been so justly lauded prevails. There are large quantities of it in the South-Sea Islands, for example, and in Iceland too. The Icelanders dress it in various forms; make a pickle of the leaves, and prepare different dishes with them; mix them with whey or bur. The old English name of Spoon-wort originated in the shape of the leaves, they resemble the bowl of an old-fashioned one; hence, too, the French name, *Herbe aux cuillers;* and some writers affirm that Scurvy-grass is the true *Herba Britannica* of the ancients.—*Helen E. Watney.*

Phyllactidium pulchellum.—This interesting water-weed has made its appearance in water obtained at Keston, and was exhibited at the late Soirée of the North-London Naturalists' Society.

MICROSCOPY.

Gizzard of the Mole Cricket (*Gryllus Gryllotalpa*).—Late numbers of your valuable periodical Science-Gossip, containing descriptions of the gastric teeth of insects and lingual ribbons of mollusca, induced me to work in the same direction, and I have been much pleased with their beauty; among others, the gastric teeth of the Mole Cricket. As the insect is rather local, it may have escaped the investigations of those of your numerous readers who are microscopists. The gizzard of the Mole Cricket is large, with numerous and beautiful teeth, visible to the eye, and when laid open and flat, forms a fine opaque object.—*J. B. Spencer.*

Gudgeon Scale.—The fish-scale figured in the February part of Science-Gossip (page 41) is erroneously described as that of a Gudgeon (*Gobio fluviatilis*). It appears to be that of the Pope (*Acerina vulgaris*).—*Henry Lee.*

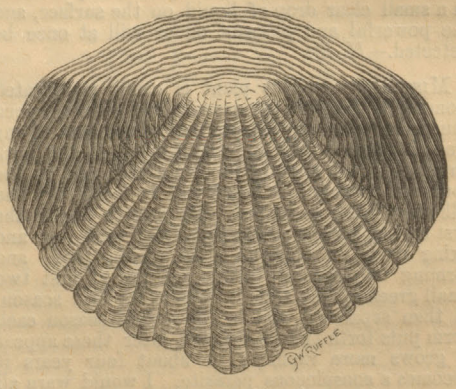


Fig. 49. Scale of Gudgeon, from specimens furnished by Mr. Henry Lee.

Pleurosigma hippocampus.—Mr. Kitton (*ante*, p. 22) states that this diatom may be found in any pond or mill-stream; inferring, of course, that it is a fresh-water species. Pritchard describes it (Inf., 919) as *marine*. Is the species alluded to by both of these gentlemen under this name the same, or is one of them in error as to its habitat? If not too late, may I take the opportunity of pointing out an inaccuracy on page 133 of the volume for 1867? Fig. 141, as it seems to me at least, in the figures of *Pinnulariæ*, appears to me to coincide with the description in Pritchard of *Pin.* (*Nav.*) *acrosphœria;* figs. 142, 144 with *Pin.* (*Nav.*) *divergens;* and fig. 143 with *Pin. stauroneiformis* (*Nav. Brébissonii*), instead of as stated in the text. The error, if it be one, may have been corrected; but, if so, this has escaped my notice.—*F. J. Warner, Winchester.*

NOTES AND QUERIES.

LAUREL-LEAVES. — I have long been an observer of the two small pores of the common laurel, situated at the base of each leaf, one on each side of the mid-rib, just above the foot-stalk. I believe them to be small glands, containing either honey, or propolis, or prussic acid, extensively sought after by bees in their early working days (whether it is real food, or propolis to cement their comb, or a poison to supply their gland I have no means of ascertaining). The supply they yield seems soon exhausted, and then the pores turn brown, and after that the bees seem to disregard them. The common vetch has some such receptacle on the stipules, for the bees are even more busy at a certain season on the vetch fields on this part of the plant.—*H. W.*

BEE ODOURS.—The Bees emit an unmistakeable odour when angry, which I have no doubt proceeds from their poison, which is an extremely volatile acid. I can generally tell the temper of my bees by the presence of this pungent aromatic odour, and no one that has ever been stung on the lip can fail to recognize it ever afterwards. Place a bee on a piece of glass, and force it to protrude its sting against the glass, and the poison may be seen in a small clear drop of liquid on the surface, and the powerful and pleasant odour will at once be detected.—*H. W.*

MISTLETOE. — This plant is easily propagated from seed. Squeeze the capsule, and place the seed thus released on any smooth part of the bark of any tree on which it thrives, press it firmly to the bark on which it will stick by its own gluten, and in the course of twenty-four hours will be found dry and adhering firmly to its bed. Its growth begins the first spring, a germ proceeding from each lobe and fixing itself on opposite sides of the seed, and forming two separate plants, making at first two small green arches, thus it remains its first season. It then separates, and in the second season each germ puts forth two leaves, and after these appear it grows more rapidly; in about four years it becomes a conspicuous parasite. I would warn all not to fix the seed on to the main trunk of any tree that is cared for, as I have known it kill large apple-trees in the course of eight or ten years; when so placed, the soft green roots penetrate into the very heart of the wood, and I have seen the dead trunks, after time sufficient has elapsed for the shrivelling up and decay of the mistletoe, as though the wood had been bored by a teredo, for the roots make many ramifications. The mistletoe will grow on many soft-wooded trees. I have grown it on apple, poplar, lime, and hawthorn, but have never succeeded on oak or Scotch fir on which it is sometimes seen.—*H. W.*

A BLUE-JACKET'S IDEA OF TECHNICAL TERMS.—When in command of one of H. M.'s ships last year, on our way home from the Pacific, I as usual had my tow net over, which by the by seemed at first to astonish the men, and even some of the officers, but several soon took much interest in the "wonders of the ocean" which came to their notice; and while mentioning this, I may remark that it seems strange that so few naval men make use of the glorious opportunity afforded them of studying natural history in all its branches and over the various countries they visit; and I think if those in authority at home were to encourage officers in such pursuits, much good would result to themselves and science in general. It is so in the American navy, and why not in ours? But to return. One evening an old quartermaster came in haste to my cabin, saying, "Please, sir, I've got a 'curio' at last." "Well, Woodmason, let me see it." He said, "It's all covered with spikes, a fish!" "Oh! probably a Drodon," said I. When he brought it—a small fish in a basin—I took it up. "Why, it is a small specimen of Orthagoniscus, perhaps Mola, but I never saw one with spines before; it may be a young one, or other species, that I can't say." The quartermaster looked, scratched his head, and said, "What did you call it, sir?" "Orthagoniscus," and away he went on duty. The officers asked him what the captain said. "Well, sir, I can't tell exactly, but t'was very much like 'O Sally, come kiss us." I need scarcely add there was a shout of laughter at poor old Woodmason's ideas of technical names. The said "O Sally, come kiss us" is now in one of those numerous subterranean passages in the British Museum, unknown except to those who care to work, and in the safe custody of Dr. A. Günther.—*H. H. Knocker, Commander R.N.*

WATER WAGTAIL.—On two recent occasions a flight of black and white Water Wagtails, to the number of forty, have appeared on my lawn, their plumage and size rather varied, some looking like young birds. In the summer they are pretty plentiful in this neighbourhood (East Devon), and for several years in succession I have had two yellow Wagtail's nests in a blank window covered with creepers, but is it not unusual to see Wagtails congregated to the number of forty?—*W. R. B.*

WASP.—I have enclosed a wasp which was killed in my dining-room yesterday evening (Jan. 22), as I thought its early appearance might interest some of your readers.—*E. B., Clare, Suffolk.*

COCK NESTS.—It is not an uncommon thing to find several unfinished nests in the neighbourhood of a Wren's nest (*Sylvia Troglodytes*, Lath.) I have found many, but never one that had any lining in it. The popular opinion is, that the cock bird builds these nests, and not having the ability to line them, he leaves them unfinished; hence they are called in Yorkshire "cock-nests." The fact seems to be, that whilst the hen is sitting, the cock employs his leisure in building. A year or two ago, a wren built her nest under the overhanging tiles of an outhouse, the foundation resting in a currant bush, and the tile forming the dome. Within a distance of forty yards, I found five of these nests; three were built in the rasp-canes. Whilst the female takes great pains to hide her nest, these rude attempts are generally built in open and exposed places. From long and careful observation, I believe that the cock-birds give very little assistance, generally, to the hens, in building their nests.—*John Ranson.*

PIGS AND MUSIC.—In old churches and cathedrals we sometimes find a carving on the miserere of a pig playing upon a bagpipe, and the little pigs dancing around. This seems to indicate a popular notion (at least in times gone by) that pigs have no ear or taste for music; such a notion, however, seems to be not quite correct: for I once saw four or five great bony pigs standing at a garden-gate, listening with the most evident pleasure to the sweet sounds of a wandering German band. They stood in a row, in perfect

stillness, with heads bent a little on one side to catch the melody; and from time to time gave utterance to their delight in a gentle grunt of satisfaction. The melody that charmed their breasts was one which rose and fell in gentle and continual waves of sound: not very attractive perhaps to educated ears; but certainly riveting the attention of these untaught creatures, whose desires are commonly supposed to be confined to the quantity and quality of their food, rather than to the enjoyment of the purer delights of sweet sounds.—*J. S. Tute.*

Fumart (Jumart).—Your correspondent, W. Gain, will find in Buffon's Natural History (vol. 22, p. 448, of Sonnini's French edition) a full description of the character and uses of three different varieties of the Jumart (doubtless the animal referred to by Mr. Gain as the Fumart) sprung from the ass and cow, the bull and mare, and the bull and she ass, respectively. Buffon expresses his disbelief in the existence of all three, deduced partly from actual experiment, and partly from anatomical considerations; and it may, I think, be assumed that such an animal has no real existence.—*H.*

Rats and Sugar.—A few weeks ago the *employés* of an eminent publishing firm in the metropolis missed half a pound of loaf sugar and could not account for its disappearance; shortly afterwards another half pound was missed, and one day last week, a pound was put in a drawer about 1 p.m., and by 5 o'clock there was nothing left but the bag with a large hole gnawed in it. Next day a rat was seen running backwards and forwards across the passage, and on being disturbed one lump of sugar was discovered, which he was evidently removing to a safe place from his temporary hiding of the night before. Is it a known fact that rats are so fond of sugar? A month or two since a rat was caught in the same establishment, and during the night she littered with ten young ones.—*A. B. Chelsea, S.W.*

Alas poor Hedgehog!—In the July number of Science-Gossip for the year 1866, "C. K." states that he observed a hedgehog running about with several bluebottles on it, which were "laying a great number of *eggs*." Perhaps the following brief notes may interest "C. K." and other correspondents who read his query. In August last I caught a hedgehog on the Epsom downs, and brought him home in the hope of a long enjoyment of his company and friendship; but before he had been in my possession many days my attention was drawn to the fact that flies were in the habit of settling on my pet's nose and about his eyes. Remembering the paragraph above quoted, I kept a close watch upon the hedgehog, but, alas! it was of no avail, for one day, about two months after the partiality of the flies for our pet had been noticed, he was seized with what appeared to be the cramp, and would eat nothing. The following day he seemed to be much worse; upon examination a gentle was found crawling out of a small hole close to the eye, and upon further search a considerable number were found among the spines. The poor animal was placed in warm water, by which means several hundred gentles were captured; however, all my work was in vain, for two days after, it was found that he was dreadfully eaten behind the ears, and that his back was in such a state from their ravages that it could be compared to nothing but a sponge. By this time he was too weak to roll himself up when touched, or to raise himself up when placed upon his side; his breathing, also, was painfully laboured. The poor creature was killed, as his case was hopeless, and it did not seem justifiable to allow him to suffer longer, however interesting the experience gained by so doing might have been. On dissection several gentles were discovered among his entrails, which were very much collapsed, and in one lung three of these terrible "parasites" were found. It would accordingly appear that not only can the larva eat its way through the skin of the living hedgehog, but penetrate far into the body.—*H. H. Mott, Union Grove, Clapham.*

Rare British Animals.—I am anxious to ascertain, as correctly as possible, the present distribution of the Badger, the Otter, and the Blackrat (*Mus rattus*), in the United Kingdom. I fear all three are being rapidly exterminated. Will any of your correspondents who can testify to the recent occurrence of any of these animals in their own, or any other neighbourhood, kindly oblige by doing so? Communications on the subject might be sent either to your valuable periodical, or to my own address. I shall be happy to send you a digest of the whole evidence in the course of a few months.—*Robert Morton Middleton, Jun., Bank, West Hartlepool.*

The *American Entomologist* for January contains interesting articles on the following subjects:—The Apple Root Plant Louse; The Parasites of the Human Animal; A Measly Wild Duck; Strawberry Worms; The Strawberry False Worm; Fungoid Growths; Plums for the Million; The Colorado Grassnopper; The Nine Pronged Wheel Bug; Grasshoppers in the State of New York; Universal Remedies, &c.

Uses of Cockchafers.—Through the columns of the *Moniteur Scientifique* one learns that nothing can be better to grease machines with, and prepare salad than cockchafer oil. In Prussia the people have reached the advanced stage of making cockchafer flour, which at present is only employed for the purpose of making cakes for young pheasants, partridges, and quails. In this country (France) an attempt has been made to introduce the white worm or larva of the cockchafer into the kitchen as a substitute for the snail, but gentlemen who are voracious where *Helix pomatia* is concerned, turn up their noses at the grub of *Melolontha vulgaris*. A servant of the name of Jonglet proposes to extract from the cockchafer colouring matter which, it is said, will make rapid strides in industry and create a small revolution in the commercial world. He states that he can get yellow out of the obnoxious insect of a colour between chromium and gold, and that each cockchafer yields a few centigrammes. Several specimens of silk dyed with this new colour have been exhibited and much admired. Taken all in all the cockchafer, what with the amount of manure he furnishes when slain in proper quantities, and the uses above mentioned, stands a fair chance of being classed as a valuable insect, and some day we may hear philanthropic persons calling out against their wanton destruction.—*Land and Water*, Jan. 23rd.

Luminous Centipede (pp. 46 and 47).—The centipede noticed by your correspondent was probably *Arthronomalus longicornis*, which is figured and described in Wood's "Illustrated Natural History."—*James Britten.*

Hybernation of 'Bees.—Much interested in Mr. Mill's paper on "The Winter Home of the Humble Bee" (Science-Gossip, p. 41), I wish to ask, 1, If August is not too early for the hybernation of bees? 2, If no passage to the cell in question ever existed, how did the bee reach its home *underneath* a large flat stone that had evidently been a fixture for a long time, including of course the heat of July? 3, May not this bee have been involuntarily confined? This raises question 4, How long could a bee endure this torpid state: air and food excluded?—*A. Hall.*

Flowers dried in Sand.—Will any reader kindly inform me how to preserve the *green* colour of the leaves and calyces of flowers dried as above? I have seen many specimens tried, but though looking well when they came out of the sand, the green hue has faded out in a few days or weeks.—*C., Barnsbury.*

Museum Curiosities.—Seeing an article headed as above in the last number of Science-Gossip by "LL. B.," I also not long since visited probably the same northern museum, and made acquaintance with possibly the same "elderly man," and under very similar circumstances. On my asking where the fish were kept, he took me to where the fossil saurians were. "There," said he, "what do you think of these?" "These, my friend, are not fish, and I want to see them." He replied, "I says they be fish." Then came the similar questions as to "LL. B." Seeing there was fun to be had out of him, I said I should be glad to know about them. "What, sir! Do you never read your Bible?" "Yes," said I, "at times." Then came the account of their getting into the rocks at the deluge. Passing on, he asked me if I had ever seen a fossil salmon in coal. "No, but should very much like to, if such a thing exists." "Well, sir, some of these here philosophers says it is not a salmon, but calls it some long name; they do give things *such* names." I asked him if his supposed salmon and the saurians and all the other fossil animals got into the rocks at the same time. "Yes, most certainly, I tell you the Bible says so." I then told him something about the different formations in remote periods, when he came to the conclusion that (as he said) "I was one of them philosophers. But you see, sir," said he, "we must have something to tell the many people who come here and ask questions." If the elderly man is not profound in scientific acquirements, yet his civility to visitors should not be overlooked. For "LL. B.'s" note *might* tend to deprive him of his place, and after all surely no great knowledge is required if his duties are, as "LL. B." says, solely to dust the cases.—*H. H. Knocker, Bridlington*, 9th Dec.

Laurel Berries.—The reason why the berries of this evergreen can be eaten with impunity is, that the pulp of the fruit does not contain any poisonous properties; the kernel or seed found in the berry possesses the same principle as the leaves; but most probably persons who eat the pulp do not swallow, or, if they swallow, do not crush, the seed. How very rarely one swallows the stones in a raison, or seeds of a grape! Besides, I much doubt whether the essential oil or virulent principle, which contains hydrocyanic acid, and is extracted from the leaves of the laurel by distillation, exists in a *ready-formed* state in the kernels. I fancy it would only become developed by contact with water, and I am not sufficiently a chemist to tell your correspondent how the juices of the human stomach would act on the seeds; but I do know enough of the powerfully *poisonous* nature of the oil to deter me from trying any experiments with the seeds, either on myself or any dumb animal; for I entertain an intense horror of inflicting needless pain on one of God's creatures:—

> Sharers in the woe, the evil,
> Adam's sin brought on us all,
> Must man add, by needless torture,
> To the curse wrought by his fall?

I know the seeds, when bruised, will flavour different liqueurs, and that when sparingly administered they do [no] harm—rather promote digestion: hence it is that hydrocyanic acid is often prescribed by medical men in different diseases.—*Helen E. Watney.*

Fruit of the Hawthorn.—One of your correspondents draws attention to the local names given to the fruit of the Hawthorn. In the East Riding of York, about Hull, they are popularly called "Cat-haws"—a name I never heard anywhere else, and the origin of which I could never ascertain. An old rhyme says:—

> "Hips and haws,
> Frosts and snows."

If there be any truth in this popular distich, we are likely to have a severe winter, for they are both plentiful.—*John Ranson, York.*

Mushrooms.—The great abundance of mushrooms this season has enabled all classes to partake of this savoury and nutritious condiment. Have any of your correspondents observed instances this autumn of their producing much disturbance even in vigorous systems, and that quite independently of the toughness of parts of their texture? The gamekeeper at this place, who has freely eaten them through the summer, and cannot have gathered other fungi in mistake, was, as well as a groom, excessively sick last week after eating some. At the same time some of this household, as well as others in the neighbouring vicarage, were effected in much the same way. The mushrooms were gathered by different persons and in various fields. An opinion exists here that mushrooms are affected by the first frost. Whether this is the case or not, their young and white caps and rosy gills gave no indication of a change.—*C. F.*

Frog Parasites.—Walking by a small stream in North Wales, in which was a quantity of the lank ribbon-like water grass that floats on the surface, a frog attracted my notice, squatting high and dry in a position of apparent motionless contentment. Not disturbing it, I passed on, and saw another, and another, all in the same state of inert stupidity! Wondering at their inactivity, I stooped down close, to look at them, and lo, the lid of the head, if I may so call it, was off, and the brain-pan, full to the brim, alive with a wriggling mass of maggots, each about three-eighths of an inch long! How did the enemy get into head-quarters? From some fly the poor frog had eaten, or by an external attack and deposition?—*W. Browne.*

New Nudibranchiate Mollusc.—This addition to our fauna, discovered in the Victoria Docks at one of the excursions of the Quekett Microscopical Club, was exhibited at the meeting of the Zoological Society of London on the 28th January, by Mr. W. S. Kent, and named *Embletonia Grayii.*

"Piece of Coal."—Had my "piece of coal" known it would have fallen into such severely critical hands as those of Mr. Dalton, it would, I am sure, have refrained from sacrificing any technicality to picturesque description. Mr. Dalton might have credited the "piece of coal" with knowing something about its own history, although, perhaps, it was not so fresh from the "manuals" as himself. His two "gross mistakes" sink into nothing when examined. With regard to the "hilly barrier" of which the coal spoke, let him refer to Mr. Godwin-Austin's paper "On the Possible Extension of the Coal Measures beneath the South-Eastern part of England." He will there find the "hilly barriers" mapped out for him, and not only so, but the statement made that "the Rhenish and Belgian coal-beds are the remains of a succession of fringing bands of dense vegetation, occupying a continuous tract of coast-line." He speaks of the Midland and Northern coal-measures of England in a similar manner. What does this mean but that in the "deeper water" other deposits, notably limestone (always a deep-sea deposit), must have been going on? Mr. Geikie, in his "Story of a Boulder" (1858), gives almost a similar statement to that of my unfortunate piece of coal. After describing the various forms of vegetable life in morass and on land, he says, "But the lifelessness of the Carboniferous forests was amply compensated for by the activity that reigned in river, lagoon, and sea. Coral groves gleamed white beneath the waves," &c. If the latter was the case, then "coral" limestones must have been forming. Is Mr. Dalton aware that in the Mid-Lothian coal-field the coal-seams actually intercalate among the mountain limestones? He had best study Professor Huxley's doctrine of "*synchronism*." Every naturalist must know that similar geographical conditions existed in Carboniferous times to those that now prevail. In shallow seas, shingle, sandstone, &c., were deposited; in the deeper parts, limestones. The Carboniferous period was no exception to the rule, as my "piece of coal" well knew. Let Mr. Dalton leave the rigidity of his manual classification, and he will see that because the "piece of coal" spoke of limestones being deposited *synchronously* with the coal-beds, it did not therefore declare that the mountain limestone as we have it does not stand in the relations to the millstone grit, &c., otherwise than as he himself puts it. This, however, should be a lesson of how easy it is to twist a general description into a series of technical errors.—*J. E. Taylor, Norwich.*

Lamperns ("L. S.," p. 45).—Jenyn's "British Vert," edition 1835; Garrett's "British Fishes," 1836; Couch's "British Fishes," 1865, all (and, as I believe, continental authorities do) make the lamprey (*Petromyzon marinus*) and the lampern (*Petromyzon fluviatilis*) *distinct* fishes, the latter rarely exceeding 15 inches, the former sometimes more than twice that length, besides other important distinctions. Both fishes are caught in the Severn. General accounts give the *lamprey* as the fish which caused the death of Henry I.—*S. M. P.*

Pipits.—Could any of your readers inform me if they have seen pipits, commonly called titlarks, in flocks? I have myself seen ten or twelve together, which could not have been the family bred last summer, for I believe four or five eggs are the ordinary number.—*Forbes Jenkins.*

The Lamprey.—The lampern and the lamprey are to be seen in different baskets in Worcester Market. The *lamprey* is the smaller and more delicate animal, with its leech-like mouth and row of breathing (?) holes on each side of the head, living by suction in the mud. It is the veritable fish immortalized in English history as the cause of Henry I.'s death, still, as then, called the "royal fish;" and I was told at Worcester that the first dish caught for the season is still sent to the Queen as her prerogative. And oh, gentle reader, tell it not above a whisper! but were you to taste of this dish, cooked in its orthodox manner, with rich gravies and port wine, you would look for evermore with lenient indulgence on poor King Henry's last weakness, only wondering that all the monarchs of England ever since have not followed his example. —*E. H. W.*

Laurel-leaves (pp. 21 and 45).—"Don" observes of the laurel (*Cerasus lauro-cerasus*), "leaves . . . furnished with two or four *glands* beneath;" of *C. Lusitanica* (the Portugal laurel) he notes, "leaves . . . glandless." I notice that "H. W. W." says that the marks are mostly two in number; while "S. M." says there are four, "rarely only two." On the many leaves I have examined two is the prevailing number, but on one or two I observed three. Curiously enough, I have never, as far as I can recollect, seen the bees on the leaves, although we have plenty of laurel in our garden.—*James Britten.*

Glowworm.—Your correspondent "F.J.D." asks, upon p. 45, how far north the glowworm has been found. Some time ago, when I was at the Trosachs, in Perthshire, my cousin and I went out for a stroll at night along the shores of Loch Achray, and, although it was getting rather late in the season, being the end of September, we saw several of the brilliant lights which betoken the presence of this curious little beetle. Having captured one or two of the creatures, we carried them up to our hotel, and displayed them in the coffee-room, to the astonishment, I remember, of the whole array of visitor-tourists, who crowded round to gaze upon the novelty.—*Edward Banks.*

Luminous Centipede.—In November, 1866, I found several specimens of the luminous centipede. Its name is *Geophilus phosphorea*. From the descriptions, I believe it to be exactly the same as those mentioned by your correspondents last month, but the phosphorescent quality is common to the genus. It is therefore, of course, natual, and does not proceed from a wound.—*M. G. F.*

Dendritic Spots on Paper.—Some observations and correspondence on this subject will be given, if possible, in our next.—*Ed. S.-G.*

Bees a Remedy.—In a curious work, by Samuel Purchas, M.A., in 1657, called a "Theatre of Politicall Flying Insects," amongst other curious prescriptions are the following:—"Bees powdered cure the wind collick. Take twelve or fourteen bees powdered in anything every morning, &c., &c. Honey mixed with powdered bees, and so taken, is healthful for the crudities of the stomach."—*W. T. Iliff, Epsom.*

Young Starlings in January.—A gamekeeper on the Apley estate found a starling's nest with young ones in it on the 9th of January last.—*Edward Banks.*

NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus: × 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals, should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. ADDRESS No. 192, PICCADILLY, LONDON, W.

J. R. M.—The black shining threads with small globose heads are *Mucor phycomyces*, a fungus.

MILDNESS OF THE SEASON.—We have resolved to commit all the multitudinous communications we have received on this subject to a snug locker to await a sharp frost.

A. F.—We think that the fumart is settled.

T. P. B.—If you please.

E. C. T. (Formosa).—The eggs of an insect, probably Lepidopterous.

R. G. (Stoke).—The last answer was not for you. The curious object is not yet identified.

F. F.—A complete *list* of British beetles will be found at the close of Rye's "British Beetles" (Reeve & Co.), but no "manuals" containing descriptions of genera and species since "Stephen's Manual" (1839), now almost obsolete.

G. J. D. should make friends with some ornithologist, or purchase an elementary book on the subject. We have no space to spare for descriptions of the typical form of a duck's foot or a squirrel's tail.

A. M.—We cannot name objects from description. Consult Douglas & Scott's "Hemiptera Heteroptera" (Ray Society).

NO NAME.—If correspondents persist in withholding their names and addresses, or using fictitious ones, they must be content if their queries remain unanswered.

S. J. N.—Not in our line.

H. W., F. J. W.—Ineligible for exchange column.

E. T. D.—*Polyporus versicolor*, very common and variable.

H. W. G.—There was one, but it appears to be almost, if not quite, extinct. We know of no other.

W. P.—The fruit of a palm, perhaps a *Calamus*.

D. P. P.—We have no doubt of it, although not in flower.

F. W.—It is clearly a Myriapod, probably *Polydesmus complanatus*.—*F. M.*

J. C. D.—1. *Fontinalis antipyretica*. 2. *Bartramia pomiformis*. 3. *Tortula Hornschuchiana*.—*R. B.*

J. C. M.—1. *Hypnum palustre*. 2. *H. uncinatum*. 3. *H. irriguum*. 4. *Blindia acuta*. 6. *H. prælongum*.—*R. B.*

W. E.—1. *Hypnum cupressiforme*. 2. *Homalia trichomanoides*.—*R. B.*

T. S.—The "*Bacillaria paradoxa* attached to a splinter of floating Dantzic timber" explains itself. It came from a marine or brackish station with the diatoms on it. Can it be shown that this same species is found in the canal, Regent's Park, or any other fresh water not in communication with a tidal river?

E. W.—Cooke's "Structural Botany" (18s. 6d.), published by Robert Hardwicke; Bentham's "Handbook of the British Flora" (12s.), published by Reeve & Co. The least expensive microscope worth purchasing is three guineas.

EXCHANGES.

AMERICAN LEPIDOPTERA or Coccoons for those from any other locality, and to correspond for that purpose. Good specimens only exchanged.—W. V. Andrews, 130, Charlton Street, New York.

DENDRITIC SPOTS on Paper, probably Crystals of Iron Pyrites or Cobalt. Specimens wanted for examination and analysis.—A. L., 61, Buckingham Road, N.

LAMP AND WING OF LAMP INSECT (unmounted) offered for good mounted objects or pupæ of British Lepidoptera.—E. Sharp, The Grove, Woodchurch Road, Orton, Birkenhead.

CORNISH PLANTS (dried) for others.—Send lists to R. V. T., Withiel, Bodmin.

BRITISH LEPIDOPTERA.—Wanted specimens of *Deilephila*, *Chærocampa* or *Sesia* for others.—C. R. Doward, 41, Copenhagen Street, Worcester.

CHALK FOSSILS offered for Silurian or other Formations; or Shells, English or Foreign.—B. A., Post Office, Faversham.

GRAMMATOPHORA MARINA (balsam or unmounted) for other Diatoms (mounted or unmounted).—J. W. S., Crown Park, Montenotte, Cork.

LEPIDOPTERA.—*L. Artaxerxes*, *C. Plantaginis*, *A. suffusa*, &c., for others.—J. Purdue, Ridgeway, Plympton, Devon.

LEPIDOPTERA for exchange.—Send lists to D. C. B., 42, Preston Street, Brighton.

PLANTS OF THE VARIEGATED DAISY (*Bellis perennis Aucubæ folia*) for any British Lepidoptera, or Pupæ of ditto, &c.—A. Mitchell, Wolsingham, Darlington.

SKINS OF THE GRASSHOPPER WARBLER (*Sylvia locustella*) for pupæ of Lepidoptera.—Thomas H. Hedworth, Dunston, Gateshead.

RARE BRITISH JUNGERMANNIÆ.—Wanted to purchase, or in exchange for other plants, by B. C. du Mortier, Montagne du Parc, Brussels.

DR. O. MÖRCH, 7, Frederiksborggade, Copenhagen, offers Greenland Shells in exchange for Exotic Shells.

GOOD FOSSIL SECTIONS of Teeth, Bones, Scales, &c., of Fish, for good Slides of Photographs.—Joseph Taylor, West Cramlington, Northumberland.

FERNS.—An American correspondent wants certain British and any continental Ferns in exchange for North American.—Address, at first, to the Editor of Science-Gossip.

BOOKS RECEIVED.

"Proceedings of the Essex Institute." Vol V., No. 8, for October to December, 1867. Salem: Essex Institute, 1868.

"Naturalists' Note-book." No. 26, February, 1869. London: 196, Strand.

"The Gardener's Magazine." Part XXXVIII., February, 1869. London: E. W. Allen.

"The Monthly Microscopical Journal." No. 2, February, 1869. London: Robert Hardwicke.

"Scientific Opinion." Nos. 12, 13, 14, 15. London: Wyman & Sons.

"Land and Water." Nos. 157, 158, 159, 160, January and February, 1869.

"Hooper & Co.'s (Florists) General Catalogue for 1869." Hooper & Co., Covent Garden Market.

"The American Entomologist," No. 5. Studley & Co., St. Louis, Mo., U.S.

"Le Naturaliste Canadien." No. 1, December, 1868. Quebec: 8, Rue de la Montagne. Basse Ville.

"Tommy Try, and what he did in Science," by C. O. G. Napier, F.G.S. London: Chapman & Hall.

"L'Origine de la Vie," par le Docteur Georges Pennetier. Troisième edition, 16mo., 1868. Paris: J. Rothschild; London: Wheldon.

"Causeries Scientifiques, découvertes et Inventions Progrès de la Science et de l'Industrie," par Henri de Parville. 12mo. Huitième année, 1868. Paris: J. Rothschild; London: Wheldon.

"Proceedings of the Bristol Naturalists' Society." Vol. III., No. 9, December, 1868.

COMMUNICATIONS RECEIVED.—J. Y. H.—A. H.—H. W.—R. M. M.—R. N.—J. R. M.—R. L. H.—R. H. E.—A. F.—A. L.—E. B.—W. L. B.—R. G.—W. R. B.—P. G.—H. H. M.—N.—E. P. H.—B.—W. H.—J. R.—G. E. F.—E. C. J.—F. F.—W. R. T.—W. F. K.—H. H. K.—M. F. D.—E. T. S.—J. W.—H. G. G.—J. S. (commonly used).—T. S.—J. S. T.—S. M.—F. N.—R. V. T.—D. A. P. W.—J. C. D.—F. W.—M. G. F.—J. R. S. C.—S. J. N.—J. B. S.—J. M. P.—J. H. S.—S. A. S.—H. W. M.—T. H., Jun.—W. B.—E. B.—F. I. B.—J. C. M.—E. W.—C. R. D.—H. L.—H. W.—D. C. B.—G. C.—S. S.—J. B.—W. H. P.—J. E. T.—J. F. D.—J. H. M.—J. P. G.—T. D.—A. J. D.—E. P.—R. H.—J. B.—J. S.—F. J. W.—J. W. S.—J. F. R.—W. G.—C. B. F.—B. A.—W. F.—A. B. F.—W. P. C.—F. K. D.—J. P.—J. W.—S. A. S.—A. L.—E. S.—F. J.—S. M. P.—J. B. (Oldham).—E.—E. H. W.—W. T. I.—E. A. N.—H. E. W.—A. S.—T. G. P.—J. S.—H. L.—I. W.—H. T.—S. M.—E. D. B.—T. H. H.—E. M.—J. W. G.—H. B. B.—A. M.—C. W.—H. W. G.—T. P. B.—E. T. D.

PHRONIMA.

By MAJOR HOLLAND, R.M.L.I.

IT is a still, soft summer evening, Her Majesty's stately frigate is gliding silently over the unruffled bosom of the South Pacific: she is on no warlike errand now, though her artillery is ready at the roll of the drum to hurl forth deadly iron showers if need be; she is on a blessedly beneficent mission, fathoming the deep bed of ocean, searching for treacherous sunken rocks and unknown shoals, and marking down the unseen dangers in the new charts that are being constructed on board, to direct peaceful traders across the wide waters and to warn them where hidden perils must be guarded against. Hands accustomed to sword and rifle are working the deep-sea-lead; officers are registering notes of winds and currents and the variations of the compass, and taking astronomical observations to fix the latitude and longitude of mountain-peaks and headlands. They have left the Fijis, and are south of the Friendly Islands; "Michaeloff," an outlier of a coral group, is in sight on the starboard-bow; the towing-net, which has been trailing smoothly astern, has just been drawn in by the weather-beaten old quartermaster, and a sun-brown, seafaring naturalist is bending over it, eagerly searching for and sorting out his prizes: he has got a good haul, he is in a glorious cruising ground, where nature seems to have done her very utmost to fulfil the fiat of her Creator, "let the waters bring forth *abundantly* the moving creature that hath life."

Eh! what strange forms he has got! What wondrous living things he is transferring to his glass jar of clear blue sea-water—the sea *is* blue here, and not of a muddy green. We may not stop to tell of one-twentieth of the marvellous creatures he has secured; but here is one—*such* a one!—for all the world like a new-boiled prawn with its head and shoulders jammed into a mother-o'-pearl thimble and its tail flapping restlessly outside, sending it tumbling head over heels as if making violent efforts to extricate itself. We *must* have a gossip about this ocean stranger: a stranger he, or rather she, is in her living state to all our marine zoologists whose personal operations do not extend to the high seas, they never see her "in the flesh," but have to form their opinions respecting her and her race from dried mummies preserved on glass slides, or from sodden and sometimes mutilated specimens sent home "from abroad" in pickle bottles.

This is an amphipodous crustacean, a *Phronima*, apparently the *Phronima sedentaria* of Latreille; though sedentary in the ordinary sense she is not, but one of the liveliest little creatures imaginable, full of comic capers, throwing summersaults all day long with her tub on her head, like Diogenes gone mad, or a street acrobat. But before we proceed any farther, let us refresh our memories on crustacean matters in general.

The skeleton of the crustacea is external, and is made up of the tegumentary envelope, which in some of the class always continues soft, but in the greater portion is very firm, forming a shelly case or armour, in which all the soft parts are contained. In many (our captive of the towing-net being one of them) it remains semi-corneous, in a condition very similar to that of insects, with which, moreover, it corresponds very closely in chemical composition; chitine in combination with albumen being the principal elements. The pigmentum, which gives the various tints, is an amorphous matter diffused through the outer layer of the superficial membrane, being secreted like this by the corium. The epidermic layer hardened in different degrees is the part which mainly constitutes

the tegumentary skeleton of the crustacea. Like the bony skeleton of the vertebrata, it consists of a great number of distinct pieces connected together by means of portions of the epidermic envelope which have not become hardened, in the same way as among the higher animals certain bones are connected by cartilages. In the typical crustacean this external framework is divided into twenty-one rings or segments, more or less easily separable or distinguishable from each other: the common shrimp affords us a ready and familiar example, "la squille est de tous les crustacés celui où les vingt-et-un segmens du corps sont les plus distincts," says Milne-Edwards. We all remember how in many other instances and in other members of the animal kingdom, several of these segments coalesce or become fused together to form the head or the carapace. These twenty-one segments, by a kind of general agreement, are placed in three great divisions of seven each, and are commonly spoken of as the head, the thorax, and the abdomen, by people who are content to use common terms; or as the κέφαλον, περαῖον, and πλέον, by others who prefer somewhat dubious Greek.

The common crabs and other walking genera that frequent the beach or the sea-bottom, whose main strength and organs of locomotion spring from the thoracic regions, have the abdomen but slightly developed, and are called *Brachyura—short-tailed*—while the swimmer families, whose largely developed abdomens are furnished with powerful muscles and natatory appendages, are styled *Macroura — long-tailed*,—the intermediate families being known as *Anomoura—irregular-tailed*. We need not refer to a host of other distinctions; suffice it to add that our "subject" wearing her visual organs in her head, and not on the top of long stalks, like some of her distant cousins, belongs to the *Edriophthalmia —sessile eyed*—section; and in virtue of possessing two sorts of feet; viz., ambulatory feet on the thorax, and natatory feet on the abdomen, belongs to the order *Amphipoda—both-footed*.

The head of this pelagic crustacean is exceedingly elongated, and its axis, instead of coinciding with that of the body, is at right-angles to the latter; the back of the head is very largely developed, the rounded fulness of the poll containing a mass of eye-facets, the rounded tapering columns from which convene and blend with the rays of the rather small black lateral eyes, which are placed immediately above the mouth, the aperture of which is situated at the inferior extremity of the head. Two minute bi-jointed antennæ, with short stiff hairs or setæ on the terminal joint, arise from the outer margin of the head, just above and in front of the lateral eyes.

The maxillary limbs constituting the jaws, correspond with those of ordinary masticating crustaceans, and need not be noticed in detail. The seven segments of the thorax bear seven pairs of legs, the two first pairs of which are *gnathopods* subservient to the prehension of food; the third pair are usually thrown forwards across the head, for a special purpose, as we shall see; the fourth pair are the longest of all; the fifth are stoutly chelate, possessing a considerable range of motion, but appear to be normally directed backwards, with the *manus* downwards, and the *pollex*, or moveable thumb, superior: the sixth and seventh pairs resemble the third and fourth, and terminate in simple claws; the seventh pair being commonly thrown back across the abdomen, for the purpose of antagonising the third pair before mentioned.

The first three segments of the abdomen are each furnished with a pair of natatory feet—*swimmerets*, —the footstalks—*protopodites*,—of which, are very large and have an inflated appearance; the three next segments taper away and are but slightly developed, having their swimmerets modified into mere bifid setaceous appendages; the diminutive *telson* which terminates the abdomen being, as usual, devoid of any.

The fourth, fifth, and sixth thoracic segments bear each a pair of respiratory vesicles or branchial sacs of a laterally compressed oval shape, connected with the posterior and inferior part of the epimeral plates behind the articulations of the corresponding limbs, the posterior pair are the largest, and the anterior pair the smallest; in each a loop of blood-vessels may be traced, the exterior of the sac being invested with a tesselated pavement of epithelial cells with large nuclei. Milne-Edwards states that there are five pairs "d'appendices vesiculeux," each of the seven thoracic segments "excepté le premier et le septième" being furnished with them; but the specimen now before us has very decidedly only three pairs, and the microscope fails to detect any trace of rudiments even of others.

The mouth, the large chelæ, and the remarkably stout footstalks of the swimmerets are tinted a deep rich red approaching to purple, the pigment in this instance is not amorphous, but is contained in beautiful stellate cells, the remainder of the body is hyaline.

Here we have Phronima disporting herself in a glass vase of her native element: the tough gelatinous transparent barrel-shaped tube open at both ends which we see her carrying, is apparently a portion of the tube of "the aggregate salpian" *Pyrosoma*, from which the zooids have been washed away; just as our common Hermit-crab, *Pagurus Bernardus*, utilises a wrecked and empty whelk-shell to shield his unarmoured hindquarters, so does this most remarkable oceanic crustacean use the castaway covering of the stolon of a *Tunicary* as a shelter for her young: probably it is the female only that we find thus accoutred with a ready-made second-hand midamental case. I doubt if the male ever assumes the office of nurse, but I regret to say that I cannot speak positively either way. The

external surface of this ocean cradle abounds in tubercles which, as well as other parts of its walls, are perforated with rounded and puckered orifices through which currents of water are observed to pass: an external membrane and an internal lining containing between them a pulpy substance, are distinctly visible: the length of this case is precisely five-eighths of an inch, and its breadth half an inch. The ova and the young are secured by a filmy band running round the interior about half way up it, they are indistinctly visible through the case as shown in the illustration.

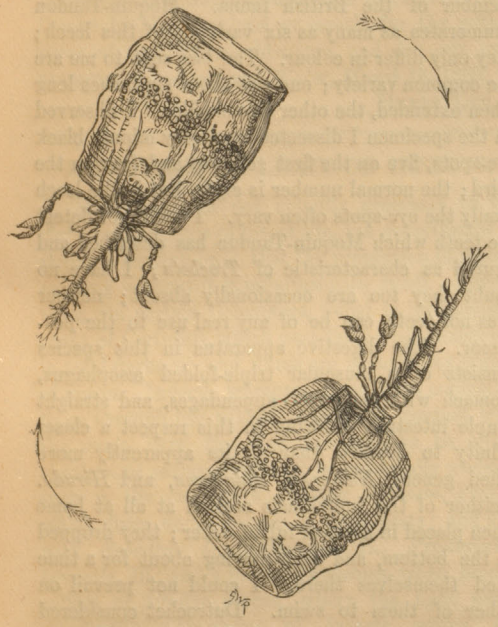


Fig. 50. *Phronima sedentaria*, × 2.
Drawn from life by Dr. J. D. McDonald, R.N., F.R.S., F.L.S.

The mother when swimming, has her head and the three first segments of the thorax inserted into the tube which she holds fast by means of the third pair of legs—which have been mentioned as being habitually thrown forwards across the head—which have their claws firmly driven into the lining membrane of the case, in front of her head. The formidable "pinchers" of the fifth pair remaining outside "clear for action" in readiness to meet an enemy, and the swimmerets on ordinary occasions are busily paddling as represented in the drawing. Sometimes on the approach of danger she draws the whole of her body within the tube, and apparently to guard against the risk of being shaken out by the shock of a collision, drives the claws of the seventh pair of thoracic feet (which seem to be normally directed backwards for the purpose) into the lining: the anterior (third) pair being, as we have seen, similarly directed forwards; she has thus a firm "set" against a jerk coming either way. Her great compound eyes placed not only in the sides, but in the top and back of her head, enable her to take in with one marvellously comprehensive glance the whole circle of her brood; the objects of her maternal solicitude, they are never "from under her eye;" no human beings are under such complete and constant supervision as the fry of Phronima.

The specimen from which our illustration was drawn, was kept alive for ten days. She was a creature of the liveliest habits, whirling about in rapid gyrations, and turning summersaults, tub foremost, with a very comical effect. She never progressed in right lines, but first ascended at an angle of about 75° with her ventral aspect towards the spectator, then suddenly twisting sharply towards the left, she threw her tail up, and came down head foremost at a like angle, bringing her right side and the back of her head into view. Sometimes she was seized with a mania for waltzing, spinning round and round without materially shifting her ground, like a buoy moored in a strong tideway: merry little Phronima was often placed on the wardroom mess-table by particular request, her strange antics affording much amusement: but she pined for the liberty of the free ocean, and drooped, and died "universally respected and regretted."

It does indeed seem strange that the preservation of the species, the safety of the broods of this tiny inhabitant of the deep, should hang upon the apparently doubtful contingency of the mother picking up just at the critical moment a suitable piece of the broken skeleton of another and widely different creature: but the plans of the great Master-builder however inscrutable to us, never fail; and we see, if we study the glorious pages of nature's outspread book intelligently and reverently, that the ends aimed at are ever infallibly attained. "We see on every side of us innumerable adaptations and contrivances, which have justly excited in the mind of every observer the highest admiration. There is for instance a fly (*Cecidomyia*) which deposits its eggs within the stamens of a Scrophularia, and secretes a poison which produces a gall on which the larva feeds; but there is another insect (*Misocampus*) which deposits its eggs within the body of the larva within the gall, and is thus nourished by its living prey; so that here a Hymenopterous insect depends on a Dipterous insect, and this depends on its power of producing a monstrous growth in a particular organ of a particular plant. So it is in a more or less plainly marked manner in thousands and tens of thousands of cases, with the lowest as well as with the highest productions of Nature." With this quotation from Darwin, let us wind up our gossip about this little-known and seldom seen Amphipodous Crustacean, trusting that time and the towing net may yet enable us to obtain fuller and more perfect details for the information of our readers.

Bury Cross, Gosport.

LAND LEECHES.

OUR correspondent "G. R." will be glad to learn that by sending to Mr. Buckland the land leeches, the habits of which so puzzled him, he has contributed to the settlement of a very interesting question connected with the natural history of this country. When Dr. Gray, in 1850, claimed for *Trocheta subviridis* a place in the British Fauna, in consequence of Mr. Hoffman having found one individual of this species in the Regent's Park, it was objected to his supposition of its being indigenous in Britain that the ovum, or the leech while young, might have been taken into the viscera of a deer or other animal in its own native country previously to its being shipped for England. Dr. Murie, in fact, believed that he had found another specimen in the viscera of a Moluccan deer dissected at the Zoological Society's Gardens in 1865, and described it in a paper which he read before that Society in November of the same year, as being identical with that previously found by Mr. Hoffman and commented on by Dr. Gray.

When I ventured to state my opinion that the leeches sent up to us by "G. R." were *Trocheta subviridis* of Dutrochet, many eminent zoologists were very naturally inclined to doubt the correctness of my identification of them. But I am glad to say there is no longer any doubt about it. "G. R." was kind enough to send me fresh specimens, and I have submitted them to Dr. Gray and Dr. Baird, of the British Museum, and also to Dr. Murie. They all agree that the leeches in question are of the species to which I assigned them, and Dr. Baird has kindly given me permission to publish for the benefit of our readers the following letter which I received from him:—

"My dear Sir,—The land leeches which you brought here yesterday belong certainly to the *Trocheta subviridis* of Dutrochet. I put them into weak spirits to kill them, but after placing them in stronger spirits, the colour has nearly gone from the leeches and imparted itself to the spirits, which is now of a fine green hue! The specimen sent some few years ago by Mr. Bartlett from the Zoological Gardens, is also a true *Trocheta;* but the one brought by Dr. Murie, and which he has described in the Zoological proceedings as the *Trocheta subviridis*, is not a *Trocheta* at all, but must belong, from the structure of the oral and especially the ventral sucker, either to a peculiar species of *Hæmopsis*, or to a new genus not hitherto described. I thought at the time when Dr. Murie brought the specimen here that it might belong to the genus *Trocheta*, but now I find it does not. If you can procure for us some more specimens I should be very glad, and any other species of the suctorial annelides will be thankfully received. Yours very truly, W. Baird (British Museum, March 6th, 1869)."

I have also received an interesting letter on the subject from the Rev. W. Houghton:—

"My dear Sir,—I am very much obliged to 'G. R.' and to yourself for the two leeches which I received on Saturday night. They were quite lively when I turned them out. One I have dissected, the other remains for future observations. There is not the slightest doubt as to the species, it is the veritable *Trocheta subviridis* of Dutrochet, and thus your first opinion is fully confirmed. As I said, this discovery is interesting, as it proves that this sub-terrestrial species is an undoubted member of the British fauna. Moquin-Tandon enumerates as many as six varieties of this leech; they only differ in colour. The two sent to me are the common variety; one was about six inches long when extended, the other was smaller. I observed on the specimen I dissected nine very minute black eye-spots, five on the first segment and four on the third; the normal number is eight, but in the leech family the eye-spots often vary. I could not detect the teeth which Moquin-Tandon has described and figured as characteristic of *Trocheta;* I have no doubt they too are occasionally absent; neither eyes nor teeth can be of any real use to the possessor. The digestive apparatus in this species consists of a muscular triple-folded œsophagus, stomach with no cœcal appendages, and straight simple intestine, showing in this respect a closer affinity to *Nephelis* than to its apparently more allied genera, *Hæmopsis*, *Aulastoma*, and *Hirudo*. Neither of the individuals seemed at all at home when placed in a vessel full of water; they dropped to the bottom, and after moving about for a time fixed themselves there. I could not prevail on either of them to swim. Dutrochet considered *Trocheta* entirely terrestrial, but M. Moquin-Tandon asserts that he has kept many individuals alive in water more than fifteen days. Further observations are wanting to clear up this point. The allied genera swim readily enough, and, as we know, live in the water for the most part. Is *Trocheta* a curious exception to the rest? If 'G. R.' should meet with more of these leeches about the beginning of June, and would kindly send me some, I should be obliged to him. About the middle of that month the leeches lay their eggs or cocoons, in which the young are developed. Again thanking you and 'G. R.' for the trouble you have taken, Very sincerely yours,

"W. Houghton."

Dr. Gray's description of *Trocheta subviridis* as belonging to the British fauna is thus confirmed. The individuals which have led to this result were found near Horsham; but I have little doubt of our soon receiving them from other localities. "G. R." says he has heard of them in Hants, and I am informed by one of my own relatives that at Linfield, in Sussex, about twenty-five years ago, land leeches were so abundant in the fields and on the footpaths

through them, that the ladies of the family who resided there at the time avoided them in their evening walks. It is not unlikely that these annelides may prove to have been all this time under the eyes of zoologists in their own head-quarters, for Mr. Bartlett tells me that he has often seen leeches on the greensward in the Regent's Park Gardens. Whether they are *Trocheta* or of some other genus, remains of course to be seen. I request the attention of our correspondents to the concluding paragraph of Dr. Baird's letter. Any British leeches, large or small, will be received with thanks by Mr. Buckland or myself for the authorities of the British Museum and for our own examination.—*Land and Water, March* 13, 1869.

Henry Lee.

INFLUENCE OF LIGHT ON INSECTS.

LIGHT, though not actually necessary to the maintenance of insect life, has nevertheless so strong a bearing on it, that the proportion of insects existing without it is infinitesimally small. Among them are certain Coleoptera, found in the monster caves of Carinthia, which pass their whole existence in total darkness, and which are without any organs of vision. Indeed, wherever insects are compelled to go through life without coming in contact with the sun's rays, the eyes are sure to be either obsolete, or so imperfect as to be practically useless: such is the case with *Claviger testaceus*, Preyss, which lives under stones in ants' nests: and also with *Sphodrus leucophthalmus*, L., *Pristonychus terricola*, Ill., and a few other species, when bred in cellars or similar places, where the light never penetrates. Numbers of insects, which see perfectly well, prefer to remain in retirement during the day, and only issue forth when the sun has sunk into the west. Most of us know to our cost, how active the gnats become in the summer's evening: and many too have listened to the "drowsy hum" of the dor beetle, or watched the "mazy dance" of the May fly: still later the glowworm lights her lamp, a signal to whole hosts of moths and beetles to come forth and seek their mates, or search for prey; not to mention the crickets, cockroaches, earwigs, bugs, lepisma, &c., all of which, like guilty things, hurry back to their retreats with the first blush of dawn. Most of the night-loving insects are so affected by the sudden appearance of light, that when a candle is introduced, they rush madly into the flame, as though they were deliberately anxious to commit suicide. "The moth circling round the flame" has many a time and oft served "to point a moral and adorn a tale." The true cause of this eccentric proceeding has never yet been satisfactorily explained. It has been suggested that their eyes do not absorb (as in most insects), but reflect the light: an organisation which enables them to distinguish objects in a state of partial darkness, but which leads to their destruction when the light is strong. Blinded, as it were, by excess of radiance, they lose all discernment in the blaze, and perish in the flame.

The larvæ as a rule seek their food only in the day time: still there are some night feeders, to whom the light is distasteful, if not hurtful: as for instance, the caterpillar of the shark moth (*Cucullia umbratica* (L.), the buff arches (*Thyatira derasa*, L.), and the heart and dart moth (*Agrotis exclamationis*, W. V.).

It is, however, in the colouring of the outer integument, that the potent agency of the solar ray is shown most conspicuously. Speaking generally, the stronger the light, the more intense and brilliant is the hue, and the more delicate is the play of colour. Such larvæ as are produced below the soil or in shady spots, to which the light of day has little access, are constantly white and colourless; and this bleached appearance clings to the perfect insect so long as the conditions remain the same. Leunis, in his "Thierreich," tells us, "that he accidentally left a bug (*Acanthia lectularia*, L.) shut up in a box for no less than six months: on again opening the box, he found the animal alive and surrounded by young ones, all of which, together with the mother, were quite white, and 'transparent as glass.'"

On the other hand, insects, which pass their lives "from the cradle to the grave" in broad daylight (as for example butterflies and chrysomelids), are far more gaily tinted, than the nightflying moths and Coleoptera, which have never been exposed to the solar rays.

The influence of light, as might be expected, shows itself very remarkably in regard to the geographical zones: the insects of the tropics being, as a rule, far more elegantly and brilliantly coloured than those which are confined to the temperate and arctic regions.

On looking over a well stocked museum, a very fair guess may be made, at a single glance, as to the quarter of the globe to which we may assign many of the Lepidoptera, the Nymphalids, the Morphos, the Uranias, by the side of which our peacocks, emperors, and admirals look dingy and homely to a degree. What a striking contrast is presented in the two nearly related beetles, *Entimus imperialis*, Fabr., the gorgeous diamond weevil of Brazil, and our common hedge weevil (*Polydrosus micans*, Germ.). Nature seems to revel in the glorious ornamentation which she has scattered without stint over the brilliant Entimus, whose wing-covers especially are encrusted with scales, which rival the noblest precious stones in the exquisite play of light reflected from every part of their surface, and which are still further set off by being embedded in hollows on a jet black background, of a velvety lustre. Nor are Nature's lavish gifts confined to this single

species: hundreds of other curculionids are to be found in these sunny regions: Eustales, Platyomus, Cyphus, Lordops, Chrysolobus, Naupactes, &c., whose elytra, when prepared for the microscope, give one rather the idea of rich caskets of fairy jewels, than a mere collection of beetles' wings. On the other hand our tiny Polydrosus can boast only of a series of long narrow scales, pretty enough in themselves, having the same glittering character as in its more richly clothed relations; but withal so minute, and having such slight powers of reflection, as scarcely to render the insect more remarkable than its neighbours: at the same time, the bold elevations and broad furrows, so conspicuous in the wing-covers of Entimus, are reduced in Polydrosus to dots and stripes which can only be discerned by means of a lens.

Again, reflected light and the special colour of the locality in which they live, are not without their influence on insects. We find, for instance, the hue of some (whether larva, pupa, or imago), corresponding with that of the soil, the tree bark or other part of a plant, on which they may be destined to live. Thus we may see in almost any garden in the summer season, how the rose aphids accommodate themselves to the colour of the leaf or twig to which they are fixed; green aphids being found upon green shoots, whereas if the latter are red, the animals upon them are tolerably sure to be red too.

Elaphrus riparius, L., a not uncommon beetle on the sides of ponds and ditches, is of a light brown colour on gravel, but changes to a green when bred, as it often is, among tufts of grass.

Pœcilus lepidus, Fabr., *P. cupreus*, L., *Harpalus æneus*, Fabr., *H. azureus*, Fabr., *Selatosomus æneus*, Steph., and a host of others are liable to important changes of colour dependant on locality. The pupa of the lesser Tortoiseshell Butterfly (*Vanessa urtica*) is naturally of a golden colour, but on a wall or fence, where it is often found, it becomes reddish, or grey, or even so dark as to be nearly black.

The inhabitants of ponds and streams are not exempted from the law which confers such subtle power on the solar ray. Light, as is well known, decreases in intensity with the depth of the water through which it is made to pass; and is, besides, broken up, in its passage through the denser medium, into its component parts. The first to be refracted is the blue ray; and in agreement with this we find that insects of a more or less purple tint, such as Gyrinus, occupy the surface. This is followed by the green and yellow rays, and here predominate the olive coloured or yellowish brown genera, Dyticus, Haliplus, &c.

Nor must we forget to notice the strange influence exercised on the insect world by the thick darkness which usually in summer time precedes the outburst of a violent thunder-storm. As the sun hides itself behind the heavy clouds, we may see the little animals making every effort to shelter themselves from the coming deluge. Butterflies seek the covert of a spreading leaf, or the rough chink of overhanging bark. The smaller beetles and Physapods nestle down into the centre of the corolla, on which they were previously feeding, and remain still and quiet; while even the industrious bees give over their labours and swarm back to their hives with all speed. While the greater part of the insect world is thus flying before the threatening clouds, the gnats renew their gambols with redoubled energy, and the bloodthirsty Horse-fly (*Hæmatopota pluvialis*, L.) plies his work on man and beast more vigorously than ever.

Even these, however, vanish with the first heavy raindrops; and then all is quiet, and Nature seems to wait the storm silent and awe-struck. But no sooner has the last of the thunder clouds passed across the face of the sun, than forth come the fugitives to their former scenes of activity; swarms of insects of every hue and every form issue from their places of concealment; beetles creep out of holes and corners; butterflies display their gaudy wings on the still dripping flowers; and once more the whir and hum of countless tiny organisms fill the warm air and give fresh life to the field and garden.

> "By myriads forth at once,
> Swarming they pour, of all the varied hues
> Their beauty-beaming parent can disclose;
> Ten thousand forms, ten thousand different tribes,
> People the blaze."—Thomson's Seasons.

ANIMAL FROM SALT LAKE.

A SHORT time since, Mr. S. A. Briggs, of Chicago, sent to the Editor a rough camera lucida sketch of an animal found in water from the Great Salt Lake, which he was unable to identify. The communication and sketch were submitted to P. H. Gosse, Esq., F.R.S., who desired further particulars before hazarding an opinion on its zoological position. Those further observations since sent to Mr. Gosse, have kindly been placed at our disposal for publication, with a reduced copy of the camera lucida sketch. That gentleman's reply may probably appear hereafter, with Mr. Briggs's consent. Although our knowledge of this creature is at present very small, it may have an important history "looming in the future."

My Dear Sir,

M. C. Cooke, Esq., of London, has sent me your note to him of the 6th inst. respecting an unknown form which I found in a bottle of water sent me from Great Salt Lake.

As in your note you express a desire to know more of it, and as I am extremely anxious to have its position determined, I beg to inclose a duplicate of the camera drawing I sent Mr. Cooke, upon which

I have placed a few additional lines, and to give you all that is known by me of its story.

Lieut. Stansbury, in his exploration to Great Salt Lake in 1849, speaks confidently of its waters being devoid of life, or any signs of life, save the cast skins of some insect (perfect form not found, and name unknown), which in certain portions of the lake were very numerous, lying beneath the water on the muddy bottom. From that time till now no observer seems to have referred to this feature of the natural history of the lake.

In October 1868, Major-Gen. G. K. Warren, a thoroughly scientific man, and one of the Special Commissioners sent out by our Government to see that the Pacific Railroad is being properly built, was at Salt Lake. He noticed that the lake was much higher than when he last saw it, and several feet higher than when Stansbury was there in 1849.

Desiring to ascertain how nearly it approached saturation, and to compare it in this respect with Stansbury's analysis, he filled a champagne bottle with it, and sent it by express to our Academy of Sciences, the Secretary of which sent it to me for a report.

The quart bottle contained hundreds of crustacea, which I identified as Artemia salina, *Leach*, and of the singular form whose figure I inclose, but that one specimen.

Desiring to exhibit the stranger to our Academy, and not daring to attempt a permanent mounting of it till after the meeting, I placed it in my live-box with some of the salt-water from the lake, made the camera drawing at once, and then kept it a week just as it was, exhibited it at the Academy, and mounted it some days afterwards, soaking it for these few days in turpentine, and giving it finally a balsam mounting. Standing so long as it did in the live-box, the salt began to crystallize, and the result was that in taking it out I lost a portion of the snout and a very little of the tail.

I am unable to find any indication of eye-spots. It has eight pairs of short legs, each with ten* toes, terminating in a sharp, black, curved claw, like that of a dog. The animal is $\frac{8}{9}$ of an inch in length, about equally divided between the body, including the head and the tail. The tail near its termination divides as indicated in the figure. The animal evidently had power to vary the position of these terminal appendages, as at one time, when I first took him from the water, they projected directly backward in a straight line with the main portion of the tail. Just after the tail leaves the body are the two organs indicated, in which I could detect no structure differing from the tail proper. The anus I have indicated thus ×. It is near the posterior pair of legs. Occupying the larger portion of the interior of the body is the oblong sac lettered A. I was unable by any devices to throw light through it so as to make out its structure, but believe it to represent the digestive apparatus. Extending the whole length of the body are the respiratory tubes. They were plainly visible in the head, and throughout the tail, passing to the very extremities of both pairs of appendages, and being much knotted as indicated near the posterior portion of the body.

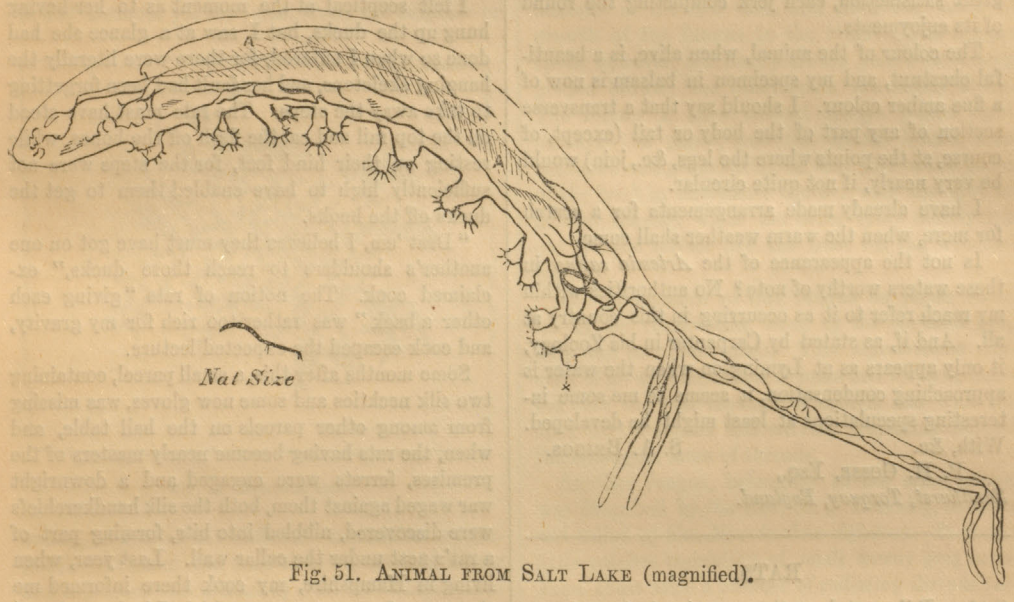


Fig. 51. Animal from Salt Lake (magnified).

* I count ten claws on two feet not belonging to the same pair, and on the other fourteen feet I count nine claws, unmistakably with indications of the tenth in nearly every instance, so I think I am safe in saying ten claws to each foot.

When I made the figure I could not distinctly make out what became of them when they reached what I call the digestive apparatus; but my balsam treatment developed the fact that these tubes traversed the surface of this sac, crossing each other several times, and I have filled in the lines to indicate this.

Mr. Warren called to see me when passing through town, and said that he saw several of these animals in dipping up the water, and that he supposed the bottle contained three or four at least, though the crustaceans were far more abundant. Mr. Warren further told me that when alive, it moved itself by jerking its tail up to its head, first on one side and then on the other, which seemed to give it great satisfaction, each jerk completing the round of its enjoyments.

The colour of the animal, when alive, is a beautiful chestnut, and my specimen in balsam is now of a fine amber colour. I should say that a transverse section of any part of the body or tail (except, of course, at the points where the legs, &c., join) would be very nearly, if not quite circular.

I have already made arrangements for a search for more, when the warm weather shall come.

Is not the appearance of the *Artemia salina* in these waters worthy of note? No authorities within my reach refer to it as occurring in this country at all. And if, as stated by Carpenter in his Zoology, it only appears as at Lymington when the water is approaching condensation, it seems to me some interesting speculations at least might be developed.

With, &c. S. A. Briggs.

P. H. Gosse, Esq.,
Sandhurst, Torquay, England.

RATS.

"A. B." must be rather a novice in housekeeping arrangements, not to have known that rats are quite as partial to sweets as mice, and, being considerably more powerful, it is astonishing the havoc they soon make in a whole loaf of sugar, when once they find access to it.

I really have been surprised at the things rats have carried off, and must confess that when I first began to "keep house" I suspected "the rats" were to take the place of "the cat" in my establishment. I was living in the country in a very old house in South Wales, and I fancied I should like to make a few alterations in the larder—alterations that would effectually prevent "the rats" from committing further ravages. I had been reading one of Soyer's books, and took the idea from it. I had a large deal board, a table in fact without legs, suspended from the ceiling by four iron rods, meat hooks were fixed in rows all along the under side of it, on which I desired cook to hang the undressed meat, joints, poultry, &c., and on the top of it there was ample room for any cooked meat and pastry. I also had some light movable steps made for cook to mount in order to enable her to reach this novel safe.

"Now, cook, I trust I shall hear no more of the rats."

"I am sure, ma'am, I hope so too. Drat the nasty things," was the reply; and for one entire week no losses were reported, but one Tuesday morning I found cook looking exceedingly anxious, and just as I was about to enter the larder she said—

"Please, ma'am, the rats have eat the ducks Mrs. Davis brought down last night." (My cook always prefaced any little information of an unpleasant nature with "please, ma'am.")

I felt sceptical at the moment as to her having hung up the ducks, but I saw at a glance she had done so when I entered, for there were literally the hanging skeletons, and her fault had been forgetting to take away the steps. The rats must have stood on the top rail and eat the flesh off the bones, while resting on their hind feet, for the steps were not sufficiently high to have enabled them to get the ducks off the hooks.

"Drat 'em, I believes they must have got on one another's shoulders to reach those ducks," exclaimed cook. The notion of rats "giving each other a back" was rather too rich for my gravity, and cook escaped the expected lecture.

Some months after this, a small parcel, containing two silk neckties and some new gloves, was missing from among other parcels on the hall table, and when, the rats having become nearly masters of the premises, ferrets were engaged and a downright war waged against them, both the silk handkerchiefs were discovered, nibbled into bits, forming part of a rat's nest under the cellar wall. Last year, when living in Hampshire, my cook there informed me that some fine greengages, which I had purchased on the previous day with the intention of making a tart, had been carried off by rats. They positively had demolished nearly a pie-dish full, there were three or four half eaten plums remaining, sufficiently bitten to point out the real delinquents.

Helen E. Watney.

SPOTS ON PAPER.

By the Editor.

IT is two or three years, at least, since some correspondents first forwarded us specimens of white paper with small dendritic spots upon them, and, from the first, we have felt convinced that these spots (all the same although from different persons) were inorganic. Recently the subject has been revived, and in December, 1868, we quoted, in reference to them, from the *Gardener's Chronicle*. "The spot on paper is a doubtful plant, named by Agardh and Lyngbye *Conferva dendritica*. It is

perhaps some chemical production, but, if not, a fungus, and not an alga. Schumacher called it *Dematium olivaceum*, making it a fungus." We then added that an experienced analytic chemist had given his opinion, casually, that the spots were inorganic, and probably iron pyrites. In January, "J. T. Y." affirmed that "they are unquestionably fungoid growths," to which, in a note, we objected that we considered our correspondent far too confident in his opinion. Since this note appeared, another correspondent has been testing the few specimens he could obtain, and through us appealed to our readers for more. He ("A. L.") states, "I have succeeded in ascertaining that they consist of some compound of the metal copper, but what compound I cannot yet say (most likely the sulphide or



Fig. 52. Dendritic spot.

oxide), as I have not sufficient material at my disposal. At about the same time we received a long and ingenious speculation by "A. S.," which added no information; and however suggestive it might be, did not give or suggest a plausible solution of the mystery; hence its publication would be useless. Those who are willing to assist "A. L." in confirming his opinion, and in determining what compound of copper the crystals are, cannot do better than forward specimens.*

Another correspondent ("S. M.") has suggested a solution of the positive assertion of "J. T. Y." in the fact that fungoid spots do also occur on damp paper. He says: "Spots on paper are not *always* fungoid growths. They are of two or three kinds. On examining some which I noticed lately as occurring in a volume of Grote's Plato I was reading, I found the spots to be some form of crystallization of iron, doubtless due to some small spot or blot of printer's ink. There were two or three groups of spots, and however small, presented a feathery appearance. With a two-inch object-glass, the spots appeared like a piece of dark seaweed. There is always a centre or nucleus, the blot (?) from which the little branches ray out.

"Curiously enough, in the very same volume the fungoid spots also occur very frequently. They are, however, minute, possessed of the refreshingly long name of *Myxotrichum chartarum* (Kunze). See *Annals and Magazine of Natural History*, January, 1862, Note on this fungus, by Arthur H. Church, B.A., Oxon, F.C.S., &c., where there are clear details of this fungus, which 'is generally found on damp straw or paper,' and where very careful and beautiful drawings of it are given. The spots on paper of both kinds are pretty nearly circular, arising from the little blot forming the nucleus in the one case, and from the mode of growth of the fungus in the other. The fungus spots, however, are nearly always yellow or a deep golden brown; the other spots are nearly black. The former I have noticed always pierce right through the paper, and the spores I have seen scattered and germinating on that part of the pages of the book in immediate contact with the first or mother fungus, while the other spots merely ray out on the surface like the frost on the window-pane."

The appearance of this fungus on paper could hardly be confounded, even by the unaided eye, with the inorganic spots. This *Myxotrichum* consists of an agglomeration of branched threads, bearing near the base clusters of spores, and with the apex dark-coloured and curved, projecting beyond the entangled mass of threads.

Another fungus, belonging to the same genus, was described by the Rev. M. J. Berkeley, in 1838, and called by him *Myxotrichum deflexum*. It forms little patches consisting of small downy grey balls. From these arise a number of radiating threads furnished with a few opposite deflexed branchlets. The sporidia are collected in patches about the base of the threads. This also is found growing on paper.

Then, again, we have two other small fungi, very similar so far as external appearance goes, which flourish under like conditions. These, however, are very different in structure, and belong to a higher group of fungi, because the sporidia are enclosed in special membranaceous sacs or asci. One of these is called *Chætomium chartarum*. The "spot" consists of a brittle thin perithecium, covered with bristly hairs, and containing, internally, long narrow asci, in each of which are dark-coloured, lemon-shaped sporidia. The base of the perithecium appears to be attached to a dark radiating mycelium. The other species, first found in 1838, is *Ascotricha chartarum*, and is thus described:—"At first appearing under the form of a minute branched *Sporotrichum*, interspersed with globose brownish conidia. As it advances in growth,

* A. L., 61, Buckingham Road, London, N.

globose black peridia become visible among the flocci, clothed with and supported by alternately branched, obscurely jointed filaments, the branches of which generally form an acute angle with the stem. The ramification of these is very peculiar, the stem and main shaft of each subdivision being almost constantly abbreviated and surmounted by the branchlet given off near the apex; this, again, is often abbreviated, and another branchlet given off, which again surpasses it; and occasionally the same circumstance takes place a third time. The apices are clavate and colourless; the rest of the filaments, when viewed by transmitted light, brown, even, and pellucid; a few globose conidia are usually attached to them. The peridium is thin, black to the naked eye, of an olive-brown under the microscope, filled with a mass of linear extremely transparent asci, each containing a single row of broadly elliptic chocolate sporidia."

A mould, described by Link as *Oidium chartarum*, may possibly be nothing more than an early condition of one of the foregoing.

There are two other moulds which appear on paper. One, called *Stachybotrys atra*, is usually on millboard. The threads are erect and branched, bearing heads which consist of a whorl of colourless very short branchlets, each of which bears a brown septate spore, so as to form a globose head of spores. The other is named *Sporocybe alternata*, and is greyish-black, forming little orbicular patches: it is so small as scarcely to be visible without a lens; the threads are almost erect, and branched in a zig-zag manner, each branch being slightly swollen at the tip, and studded with oblong sporidia.

I think that I have enumerated all the fungi which habitually establish themselves on paper, some rarely, others commonly; or at least all which belong to this country. Not long since, some paper from Burmah came into my possession, which was covered with a species of *Chætomium*, described by Corda as *Chætomium Indicum*, perhaps the most beautiful of all in that genus; but this cannot be regarded as a British species, although developed after its arrival.

No one who becomes acquainted with the fungi found upon paper will, like "J. T. Y.," confound them with the dendritic spots, so long a puzzle; now, apparently, nearer solution. The confusion which seemed to exist in the minds of some readers must be my excuse for this—rather too technical—communication.

"TOMMY TRY."

THE beach at Exmouth, throughout a great part of its extent, is sandy, and affords a considerable number of shells. Of these I obtained in a few days about thirty species, of which the greater part were marine, but there were one or two land and fresh-water kinds, which had doubtless floated down the river Exe.

I noticed on the sand large numbers of Medusæ, which varied from the size of a crown-piece to nine inches in diameter. These appeared to be of two species, the most common of which was of an opalescent white, with stripes of lilac; a second was of a smoky white, with darker marks of the same colour. I was anxious to take home some of these, but on handling them I received a sting similar to that from a nettle. I afterwards heard that a species of this class is called the "sea-nettle." I avenged myself for the sting by afterwards chopping up many of these animals with my spade.

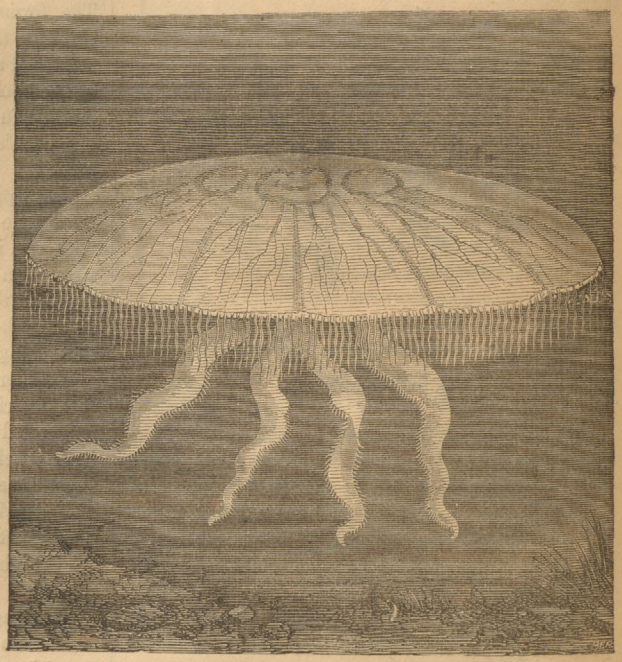


Fig. 53. Auriculated aurelia (*Aurelia aurita*).

The rocks further down the river afforded numerous limpets—*Patella vulgata* and *P. pellucida*; the dog-whelk, *Purpura lapillus*; and a peculiar species of algæ, which, although truly cryptogamic, had somewhat the appearance of the grass wrck, *Zostera marina*. This plant reminded me of some weed which had been brought home by a sea captain from the Bahama banks, and was believed by him to be the same as the floating marine plants which served to assure the mutinous crew of Columbus of the existence of land in that part of the world. It met

him at the gates of the New World, to strew his path, as it were, with flowers of the ocean, to hail the triumph of its conqueror and its king. This simple weed opened to me a new domain—the vast world of chemistry.

I put some of the weed in a bottle of fresh water, to compare it with that brought from the West Indies. It had been there about a fortnight, when I noticed a great change in the water, from a colourless state to a hyacinthine violet, resembling the modern magenta; and I have since thought that a *reaction* had taken place similar to that which occurs during the formation of a litmus, cudbear, or archil.

My female friends at once exclaimed that I had rediscovered the purple of Tyre. I dipped dolls' clothes of different materials in the dye, to which I added a small proportion of soda and alum; calico which I stained with it appeared of a bright purple-red colour, which it retained for years. — *From "Tommy Try," by C. O. Groom Napier.*

EPISTYLIS.

I HAVE found the species of Epistylis here figured of frequent occurrence upon *Cyclops quadricornis;* upon which it multiplies to so great an extent as materially to interfere with its progress through the water, appearing to the naked eye as a little cloudy mass about the Cyclops. It consists of a great number of vorticella-like bodies attached to a many-branched transparent pedicle. The individual animals are frequently so crowded, and in such constant motion, that it is difficult to make out their structure. In the figure only a few are represented, for the sake of clearness. As in Vorticella, a fringe of cilia surrounds their mouths, the course of which on one side is bent into a little hollow, out of which such things as the animal rejects as unfit for food are driven by the strong current produced by the action of the cilia.

Those things which are selected for food (with a rapidity of choice which is exceedingly wonderful) are gathered into a vacant place immediately below the mouth (*e*), from which they quickly pass into other parts of the body, and are gradually dissolved and absorbed. When they are fed with indigo or lake, the particles are greedily devoured, and appear as very dark blue or bright red fusiform spots in the body. When the animal is disturbed, the fringe of cilia is withdrawn into the body (*b*, *d*), but it is quickly protruded again, the lip, as it were, turning back in order to allow the ciliary motion to proceed without hinderance. The integument of the body is striped with very minute transverse wrinkles, but this structure can only be well seen when the creature is sufficiently still to allow of careful focussing, or happens to come exactly into focus. The body contains granular matter and a vacuole, as in Vorticella, which occurs a little below the mouth, and which appears and disappears with a certain amount of regularity. It is a question whether this disappearance arises from the motion of the animal, by which the vacuole is thrown out of focus, or whether it results from the closing together of the sides of the vacuole. It seems to me that the disappearance arises from the latter cause; for when the vacuole has disappeared, no change of focus will cause it to reappear; which, of course, would occur if the vacuole were there. And when the vacuole is in sight, and the focus is altered, it does not disappear, but remains as a blurred spot. It appears to me that the edges close together, for the definition remains *sharp* up to the moment of disappearance.



Fig. 54. Epistylis, × 238.

The individual animals are readily detached from the pedicle (*f*, *g*), and swim about by means of their cilia, seeking some unfortunate cyclops upon which to settle and found a new colony. Single animals occur attached to such; and it is apparently by the longitudinal division of the body and a portion of the pedicle, that the one animal becomes at length a large colony. In one of the animals when free I have noticed a peculiar spiral formation or nucleus (*f*). They occur in the Podophrya stage (fig. *h*), a condition of still life through which many of the family of Vorticellina seem to pass.

J. S. Tute.

A NEW INSECT FROM CEYLON.

THIS new and very interesting hemipterous insect, to which I have given the name of *Tingis hystricellus*, was discovered in Ceylon and collected from the Bringall plant by Mr. Staniforth Green, a gentleman long resident in that island.

All the species of the genus to which it belongs are small, but the present species is exceedingly minute; the largest of the specimens I have yet seen scarcely attaining to $\frac{1}{8}$ of an inch in length. When examined, however, in the microscope, it is an elegant insect, and, properly mounted as an opaque object, it makes a fine binocular slide for the low powers.

of the genus may therefore well be called "world-wide."

The character which at once distinguishes the *Tingis hystricellus* from all other known species of the genus, is the complete armature of spines, which project from various parts of the head, thorax, and elytra. Each of these spines, when examined by a somewhat higher power, is found to have a sharp point or seta, projecting as from the open end of an investing sheath.

The integument of the elytra, as well as that composing the dorsal surface of the thorax, appears like a thin membrane nearly as transparent as glass, supported by a strong reticulation bearing the spines, which radiate in every direction. The metathorax

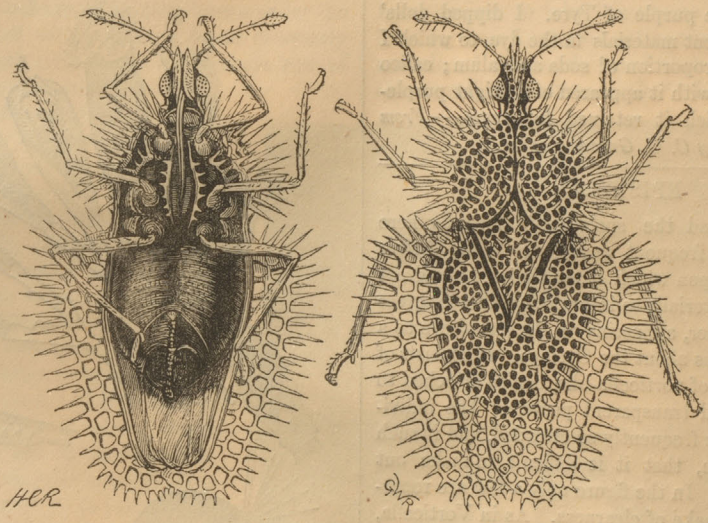


Fig. 55. *Tingis hystricellus*, × 20. Ventral and dorsal aspect.

Very little appears at present to be known with respect to its habits and economy. Mr. S. Green says:—

"It is common here, and hundreds of examples may be found upon a single plant. Those I now enclose were dried between the leaves of a book, and afterwards exposed for a couple of hours to the direct rays of a hot sun. All I can say of its habits is that it sticks close to the under side of the Bringall leaf, and there undergoes all its changes, from the larval to the perfect state. The larvæ are black."

Tingis is a genus of Fabricus, described in the "Systema Rhyngotorum" (p. 124). Various species of *Tingis* are found nearly all over the world. In the cabinet of the British Museum may be seen specimens from England and France, some of them nearly as small as the species here figured; as well as several from Africa, North America, and the Philippine Islands. Other species are found in Sweden, and in fact all over Europe. A large number inhabit South America, and four or five have been taken in the island of Ceylon. The distribution extends far backwards, simulating, as it does in many allied genera, a large pointed scutellum. The pupa is exceedingly interesting, being of a dark brown colour, and covered with white spines: those along the sides of the abdomen are compound or branched, and each branch has a projecting seta. These compound spines are not found on the imago.

Some of the species in the cabinet of the British Museum are very beautiful, not only in form, but in colour. They all show a tendency to a reticulated structure of the elytra; but the present species differs from all of them in the quantity of spines bristling over the dorsal surface. It is, in fact, a little insect porcupine, and fully justifies the specific name of *hystricellus*.

I believe that mounted specimens of these insects are, or will be shortly, to be procured of Mr. Baker, in High Holborn. For the opportunity of figuring and naming this pretty species of *Tingis*, I have to thank Mr. Curties, F.R.M.S., who has kindly placed his specimens at my disposal.

Kensington. H. C. Richter.

THE HERON.

(*Ardea cinerea.*)

As we traverse the marsh with dog and gun, in pursuit of snipe, we may almost depend upon seeing a Heron, but seldom indeed can we get near enough to take a good look at him; his long neck and equally long legs enable him to keep such a sharp look-out, that on the least approach of danger, he unfolds his broad wings, and first flapping for some yards along the ground, he rises slowly into the air, and sails away to a safer haunt. But should you detect him at a distance before he sees you, there is a chance of your being able to stalk him, especially should he happen to be in the bed of a river, or stream. It will often require as much tact and exertion to approach a Heron, as to stalk a deer, but should you succeed in getting near him unperceivedly, you will be amply repaid in observing his movements, and may finally bring him to bag, and study him at table with lemon and cayenne.

We speak from experience. We have made many a successful stalk, and can confidently state that a young Heron, nicely roasted, with the adjuncts above named, forms a dish by no means to be despised.

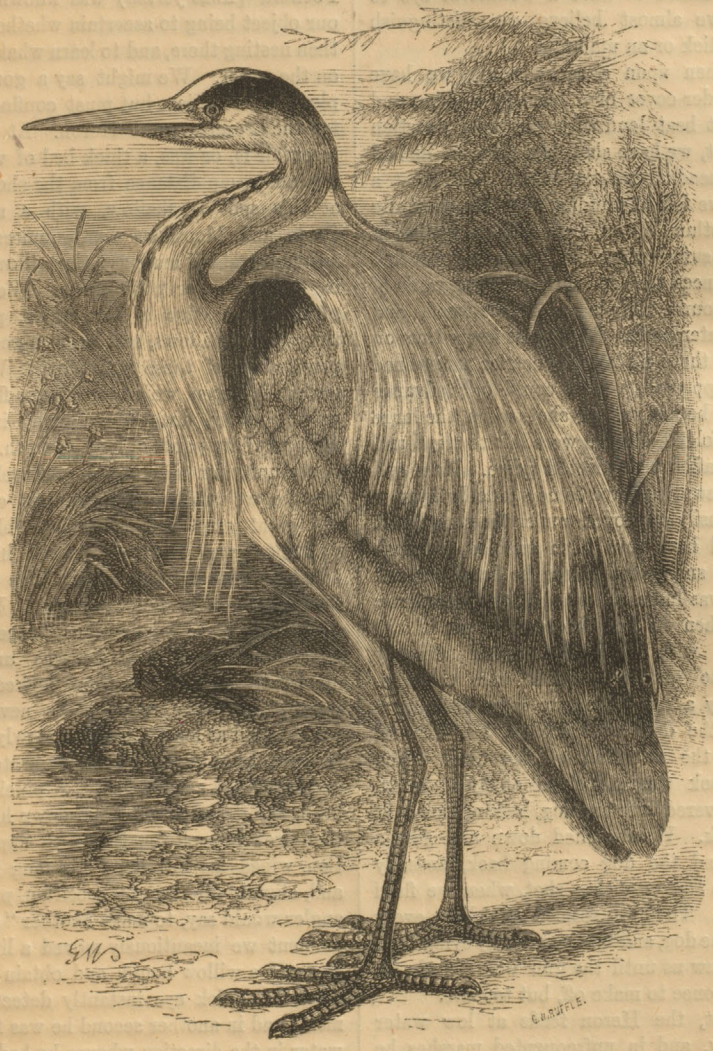


Fig. 56. The Heron.

On most parts of the coast the Heron may be seen at low-water, fishing in the little pools which have been left by the receding tide: here he finds crabs, shrimps, and other delicacies; but instead of being sociable, like the gulls, and redshanks, and

inviting a friend to join him at dinner, he goes to his own particular pool, like an old gourmand to his club, and keeps the best of everything to himself.

We have watched him on the rocky weed-covered shore of Northumberland, on the shining sands of Lancashire, and on the dreary mud-flats of the Sussex harbours, and have found him always the same; shy and suspicious, even where seldom disturbed, he seems to have a wonderful eye to danger, and we almost believe can distinguish a gun from a stick or an umbrella.

Now and then upon a rocky coast, we have stalked him under cover of a friendly boulder, and while our heart beat loud with the rapid exertion and excitement, we have shot him just as he had detected our head above the rock. And what a triumph have we felt in standing over his prostrate form, and smoothing his expansive wings, feeling in that moment a sufficient reward for having crawled on hands and knees, perhaps three hundred yards of treacherous ground, slipping over sea-weed, and through salt-water pools. But it was never thus on the mud flats; there no friendly barrier intervened to screen our approach, and we could only advance near enough to be just out of shot, when the large wings were unfolded, and we were left to stand and gaze wistfully after the coveted prize. Now and then at early dawn, we have come suddenly upon a Heron while busily employed under the steep bank of a brook, and have thus been enabled to knock him down with snipe shot before he could get out of range. It was ludicrous to observe the surprise of the bird when he first became aware of our presence, and with a hoarse croak clumsily endeavoured to get away. On one occasion, accompanied by a red setter, we were stalking a Heron, when the dog, over-anxious, ran forward and attracted the attention of the bird, which immediately took wing; instead of flying away, however, he hovered over the dog, looking down at him like a hawk. We crouched down and gave a low whistle, and the dog coming back, actually brought up the Heron within shot, when we fired and killed him. The bird seemed to follow every movement of the dog, and was so intently eying him, that he never saw us until the gun was raised; he then turned at once to make off, but too late.

On the coast, the Heron feeds at low water during the day, and in unfrequented marshes he may also be caught fishing in broad daylight; but when compelled to get his living at reservoirs, ponds, and rivers, which are oftener visited by his enemy, man, he prefers to come just before day-break or after dusk. In autumn, when the brooks run dry, we have frequently noticed the impressions of his long toes, visible for miles on the soft mud, showing the great extent of ground traversed in his patient search for food. Fish, frogs, mussels, and even water-rats, are all included in the Heron's bill of fare. He will take young water-fowl too from the nest, and after pinching them all over in his formidable bill, and holding them under water till they have become well saturated, he throws up his head, opens his mandibles, and the "Moorhen souché" disappears.

Some years ago we paid a visit in the month of May to a certain reservoir in Yorkshire, where the Pochard (*Anas ferina*) was known to have bred, our object being to ascertain whether this duck was then nesting there, and to learn what other fowl were on the water. We might say a good deal of that pleasant excursion, but must confine our attention for the present to the Heron. At one end of the reservoir is, or was, a thick bed of willows, extending out some distance from the shore. The water at this spot is shallow, with a muddy bottom. Coots and Moorhens were numerous and noisy, swimming about amongst the willows, and collecting materials for their nests. We lay upon the grass at the edge of the water, peering quietly through the willows, and learnt a good deal of the private life of these water-fowl. While we were gazing, a Heron, which must have flown unnoticed up the water, dropped suddenly in the shallow, within twenty yards of our ambush. Here was an opportunity for observation: scarcely venturing to breathe, we watched with interest every motion of the great grey bird. His long black crest and pendent breast feathers showed him to be fully adult, and we thought at the time we had seldom seen a Heron in finer plumage. With head and neck erect, he took a cautious glance all round, as if to satisfy himself that he was unobserved, and apparently assured, he then looked down at the water; for some minutes he never altered his position, till at length, bending slowly and gracefully forward, he suddenly struck the water with his bill, and recovered a small fish. A pinch, a toss of the head, and it had disappeared down his throat. He then drew himself together with apparent satisfaction, wiped his bill upon his long breast plumes, and, slightly altering his position, prepared, as an angler would say, to make another "cast." At this moment we incautiously moved a little to one side to avoid a willow bough and obtain a better view, when his quick eye instantly detected the movement, and in another second he was flying down the water in the direction whence he had come.

There are few sights more gratifying to a naturalist than a heronry. We have had the privilege of visiting three: one at Walton Hall, Yorkshire, the seat of the late Charles Waterton; one at Milton, near Peterborough, belonging to the Hon. George Fitzwilliam; and one at Wanstead, the property of Lord Cowley. Did space permit, we might give a detailed and interesting account of all we saw on these occasions, but we can do no more than offer a

few brief remarks on the general appearance and situation of the heronry last named.

The date of our visit was the 5th of April, and the birds were then sitting on their eggs. The Heron is one of the few waders which resort to a tree for the purpose of nidification, and a stranger sight than a number of these great birds perched at the top of a lofty elm, can scarcely be imagined. Twenty years ago, the Herons at Wanstead Park tenanted some trees at a different spot to that which they now frequent. At present they occupy some tall elms upon an island in the largest piece of water in the park. The keeper informed us that there were about thirty pairs. We proceeded to the boat-house, and after bailing out the boat which was nearly full of water, steered for the Herons' island. A good glass enabled us to see the birds very clearly, and most of them were in splendid plumage. The nests were placed at the very tops of the trees, and many of them were occupied by a sitting bird.

Here and there a Heron stood erect upon a bough, with head and neck drawn in, looking for all the world like a cold sentinel, with his bayonet between his teeth, and his hands in his trousers' pockets. As we approached the island several loud croaks were heard, and the sentinels took wing, the sitting birds being the last to leave. Taking it for granted that the bird which sat the longest was the most likely to have eggs, we selected a tree from which a Heron flew as we reached it.

It was a wych-elm about forty feet high, and the nest was placed amongst the topmost branches. After a fatiguing climb, owing to the absence of boughs for a considerable distance, we reached the top, and paused to rest before looking into the nest. And now was the anxious moment. Were our exertions in vain? Was the nest empty, or were we to be rewarded with the sight of eggs? The nest was large enough to sit in, composed externally of large twigs, chiefly elm and willow, and lined with smaller twigs, fibre and dry grass. It overhung our head to some extent, so that we were obliged to pull away a portion of the side before we could see into it, when, to our delight, four beautiful eggs were displayed, their bright bluish-green colour contrasting well with the dark fibre on which they were laid.

The wind blew in gusts, and it was no easy matter to get them down safely; but at length we succeeded in getting them into our handkerchief, and holding the ends together in our mouth, brought them down without a crack. They were considerably incubated, showing that they had probably been laid about the end of the third week in March. The Heron, indeed, is one of the earliest birds to breed. The young, when first hatched, present a very remarkable appearance, and are fed by their parents for a long time before they can shift for themselves.

A friend once kept a Heron on his lawn, and a very amusing bird he was. When first captured, he was very sulky, and refused all food. Fearing he would starve, the owner forced some fish down the bird's throat, but the next moment saw it returned upon the grass. The process was repeated with the same result, and a third time my friend endeavoured ineffectually to overcome the obstinacy of his captive. At length, reflecting how the Chinese treat their trained Cormorants, by fastening a strap round the neck to prevent the fish from *going down*, he tied a piece of tape round the Heron's neck, to prevent the fish, in this case, from *coming up*. The experiment was perfectly successful, and the bird finding it impossible to disgorge, at length abandoned the attempt, and subsequently fed himself. Fish were placed for him in a fountain on the lawn, and he evinced great delight in taking them from the water. One day a rat was observed helping himself to the Heron's food. The rightful owner caught him in the act, and with one blow of his formidable bill felled him to the ground. Seizing him, then, before he could recover, he carried him squeaking to the fountain and ducked him. After shaking him well under water, he held him up for examination. The rat spluttered and squeaked in abject terror, and again was he submerged. The dose was repeated, until the unfortunate rat at length succumbed, and being by this time nice and tender, the Heron pouched him, and his then elongated form was seen distending the thin skin of the bird's neck in its passage downwards, until it finally disappeared for ever.

J. E. Harting.

DRAWING FROM THE MICROSCOPE.

THE difficulty experienced by all microscopists of delineating upon paper, with accuracy, the varied objects placed under the instruments, is only *partially overcome* after many years' tedious practice and observation.

The well-known and long-tried Dr. Wollaston's prism, and the neutral-tint glasses, although having many objections, have still retained their position as mediums for drawing: the difficulty always is, being unable to see the point of the pencil.

When I say always, I mean a person who is about to make, perhaps his first drawing, not those whose eye is tutored with years of experience; although we know that it is not certainty with them.

The outline being followed, and drawn with tolerable accuracy, the fine and delicate detail must be filled in by observation, from the instrument, as every microscopist is aware. Suggestions and appliances have from time to time been devised, whereby the object may be followed on tracing-paper from greyed glass. So far so good; but every

one is aware a drawing looks very objectionable when finished upon tracing-paper: further, there is a considerable loss of light in passing through the medium or paper. What we require is, in being able to draw upon a piece of card or Bristol board. To this end I have made many experiments, and the most successful and (I may be pardoned for adding) very satisfactory and simple means I beg to place before your readers.

I enclose a rough sketch to simplify the description. A is a ring containing two mirrors, one a concave of about 6-inch focus, the other a flat one. B is a small milled head to regulate the angle of rays: on the opposite centre there is a little larger milled nut, which clamps the mirror tight to the arms C. D is an ordinary clip, lined with cloth to prevent scratching the lacquer, with a milled head E, to clip it tight to the body of microscope F. G represents the card or paper for drawing upon. To use this apparatus proceed thus:—1st. Place the microscope in a horizontal position; direct the rays of light from a Bockett or other lamp, carefully excluding all rays not concentrated upon the mirror, or, in other words, concentrate all the rays you can from your lamp on to the *concave* reflector, so as to illuminate as powerfully as you can. 2nd. Take out the eyepiece and slip the clip D on to the body; do not tighten the clamp E until the eyepiece is in, as it will help to support the pressure exerted on the tube, as many instruments have rather thin bodies. 3rd. Set the angle of the mirror by the milled head B, and clamp it by the tightening screw. By using the flat mirror you obtain brightly illuminated and full of detail, on your card or paper a view the same size as presented by the microscope; but by using the concave mirror you obtain a much larger picture, without, of course, altering your objectives, and by raising your instrument a little (of course altering the light at the same time) you rapidly enlarge your diagram.

I hope this little appliance may be of some service in that most difficult of all drawing (microscopical); and should any of your numerous readers require further instruction, it will be cheerfully given by your constant subscriber,

W. Scantlebury.

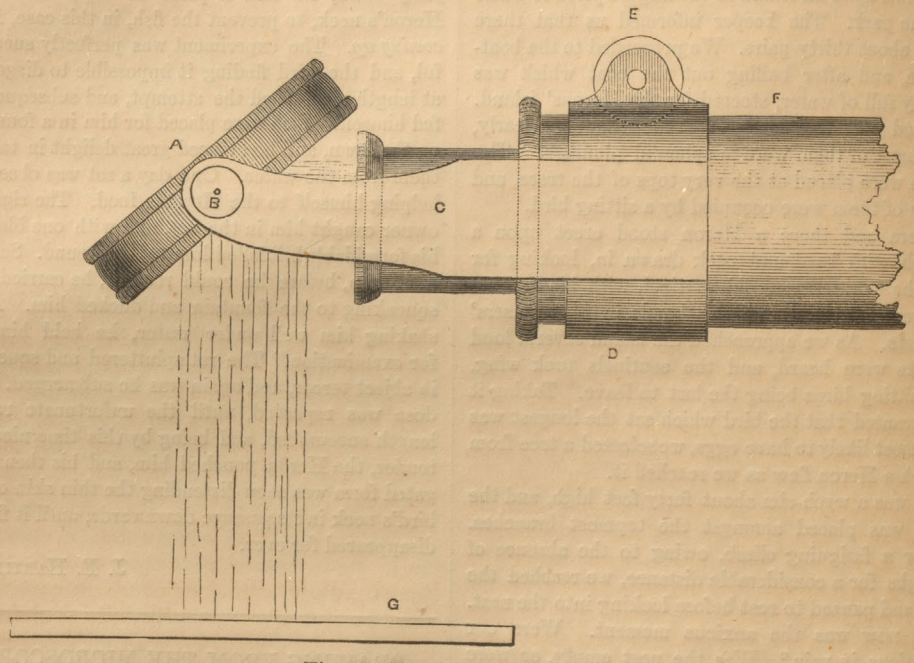


Fig. 57. Drawing Apparatus.

Macrospores.—I have found the macrospores spoken of by E. W. Binney at the meeting of the Manchester Philosophical Society, January 26th, 1869, in shale from above the Low Main seam of coal at Cramlington, Northumberland. They are flattened and disc-like in appearance, and in one or two instances the triangular markings are seen the same as in the microspores of *Lepidostrobus*. In a section of *Lepidostrobus* now in my cabinet the triangular markings on the microspores are well shown in some, and in others the spores are seen breaking up at the triangular marking into sporules. Whether the macrospores break up in the same way or not I think has yet to be determined.—*John Butterworth.*

ZOOLOGY.

Cynips aptera.—At the meeting of the Entomological Society (February 1st) Mr. F. Smith stated that he had on one occasion found a mass of barnacle-shaped galls on the bole of an oak in Bishop's Wood, Hampstead, from which a number of specimens of a wingless *Cynips* had been produced, which could not be distinguished from *Cynips aptera*, reared from the currant-like galls on the rootlets of the same tree.—*Gard. Chron.*

Daddy Longlegs again.—For the last week or two the Hackney Downs have presented a singular appearance from an eruption of the brown larvæ of *Tipula oleracea*, which have "wriggled" out of the turf in myriads, and, swarming on the paths, have been crushed to death in thousands by the passers by. They are especially numerous around the lamp-posts, lying in strata quite an inch in thickness, the dead and dying masses of larvæ affording by no means an agreeable spectacle. Immense numbers of the perfect insect occurred on the Downs and other open fields in this neighbourhood last autumn, as was humorously recorded by "S. B. J. S." in the November number of Science-Gossip. The ugly little animals, now so prematurely making their *début*, are doubtless the unfortunate descendants of that long-legged host, whose light-seeking propensities will perhaps account for the masses of their bairns at the lamps; although, the ground there being gravelled and quite destitute of grass or roots, it is somewhat difficult to conceive how they found sustenance, unless, indeed, the passion of their race for enlightenment is developed so strongly in the adolescent "daddies" as to impel them to quit their burrows in the turf and seek it even on the paths of death. A considerable number of a species of coleopterous larva accompany the tipulæ.—*W. Cole, Clapton.*

The Moa or Dinornis.—Two very valuable additions have recently been made to the museum of the Natural History Society in Newcastle-on-Tyne. One is an almost complete specimen of *Dinornis casuarinus*, and an almost perfect leg, foot, and pelvis of a larger species, *Dinornis robustus*. The former bird stands a height of upwards of five feet, and the leg of the latter is more than five feet in height, and must have belonged to a bird of not less height than ten feet. The bones which when united form the specimen of *D. casuarinus* do not belong to one bird, but have been gathered and classified from a large miscellaneous collection of Dinornis bones received from New Zealand, and presented to the museum at various times by Mrs. Dodd, Captain Collinson, and Captain Llyte. Skeletons of six species of Dinornis are exhibited in the Canterbury Museum, New Zealand; one or more specimens of Dinornis are exhibited in the British Museum; a very fine specimen is, I believe, exhibited in the York Museum; and, so far as I know, no other provincial museum, except ours in Newcastle, possesses a complete specimen of this reputedly extinct gigantic bird, the New Zealand Moa. The bones of the Newcastle specimen are in a tolerably good condition of preservation, but, owing to their having lain for a considerable period in swampy marshy localities, they are somewhat friable, and require great care and skill in fitting up the skeleton, to avoid the breaking or seriously damaging the bones. Mr. J. Hancock, with his usual skill, has accomplished a very difficult self-imposed task, and deserves credit for his patience and skill.—*T. P. Barkas, Newcastle-on-Tyne.*

Parrakeet Breeding.—A lady with whom I am acquainted had two pairs of the small Australian ground or warbling parrakeets (*Psittacidæ*) brought over by her son last year. Towards the end of the year one pair became very restless; she therefore put in the corner of their cage the outside case of a cocoa-nut, with a small aperture for them to enter, and, on looking into it some days after, to her agreeable surprise, she found two bluish-white eggs had been laid. The hen bird sat on the eggs very closely for some days until a young parrakeet made its appearance, much to the joy of its parents. It is now about a month old, and is in perfect health. The plumage is the same as the full-grown birds, but not so brilliant. The remaining egg was addled, and the old birds ejected it from the nest.—*E. D. Burton.*

Nesting of the Lesser Redpole.—Yarrell gives Halifax as the southern limit of the lesser redpole in the breeding season. This, however, would seem to be an incorrect statement, for even in that writer's time Mr. Wolley had found the bird breeding annually in Nottinghamshire. Since that time nests have been found in Derbyshire, Staffordshire, and (as it is reported) in more southern counties. Perhaps some of your ornithological readers may feel interested in the testimony which I can give as to the lesser redpole breeding in Leicestershire. Some time ago, when on a nesting excursion with my friend Mr. W. Theed, of Carlisle, I found a nest of the lesser redpole, placed in a thorn hedge, on land belonging to Mr. Kirby, of Humberstone, in Leicestershire, within a few feet of the frequented bridle-path leading from that village to Barkby. There was little, if any, attempt on the part of the bird to seclude its nest; for, although well matted in by thorn on the hedgeside, it was glaringly conspicuous to even the casual stroller along the field, if near the hedge. Moreover, I failed to perceive the elegance of structure which is apparent in the usual architecture of this bird in the nest in question, the chief materials employed

being moss, and dry grass of many degrees of fineness: it was extravagantly lined with the catkins of the willow. Besides this profuse lining, I detected what appeared to me to be the down of the coltsfoot, but on this point I will not entirely pledge myself. This nest contained four eggs in the second week of June. I feel myself quite justified in being very strongly convinced that the lesser redpole is by no means an uncommon breeder in Leicestershire, or indeed throughout the entire Midland district, for I have often met with it in May and June, in various parts of the county. There can be no mistaking it at sight, for ere many minutes it betrays itself to the observer by its tit-like evolutions. In the winter they will come with the siskins. I have met with both species, the latter sometimes in flocks, at Rothley, Stretton, and Enderby, in Leicestershire, always in the vicinity of stunted trees.—*Edward Peterson.*

Sand Lizard.—Many naturalists (Mr. Wood amongst others) speak of the impossibility of keeping these little creatures in captivity. It may be interesting to them to learn that Mrs. King, the wife of the well-known Mr. King, in the Portland Road, has not only kept *adult* sand lizards all the winter, feeding them on raw beef, but has even succeeded in making them breed: she had some babies of this species in her possession a few days ago, fed on milk, and as lively as possible.—*F. L. H.*

Voracity of Sea Anemone.—Dr. Johnston tells us (Brit. Zooph.) of a crass (*Tealia crassicornis*) that swallowed a valve of the great scallop. This extensive mouthful was, however, quite equalled by one I witnessed a few days ago. A crass, about 2½ inches in diameter, was found with *two* mussels half in and half out of its rapacious maw. The mussels were nearly three inches in length, and were standing upright in the mouth of the crass. The sharp angles of the molluscs did not appear to inconvenience it in the least: the only difficulty seemed to be the stowing away of two creatures three inches long in a cavity that could not at its greatest elongation measure more than two.—*F. W., Tenby.*

The Badger and Otter.—Badgers are still to be met with, though rarely, in Buckinghamshire. One taken in this county was recorded in Science-Gossip, I., 87. Three or four years ago a female badger and four young ones were dug out, with considerable difficulty, near Fingest; and last year one was captured at Naphill, near High Wycombe. An account of one taken at Oxford will be found in the *Field* of Feb. 6th. A female otter, three feet in length, and weighing 15½ lb., was shot on an islet in the Thames, near White Place, Cookham, Berks, on the 10th of August, 1868: her four young ones were destroyed at the same time. See *Quarterly Magazine of High Wycombe Nat. Hist. Soc.*, II., 48. —*James Britten.*

Helix lamellata.—This tiny snail is a rare inhabitant of woods hereabouts. Thompson in his "Natural History of Ireland" mentions two localities, each of which is about four miles distant from Belfast. The shell is a real sylvan gem, that well rewards the patient collector for his persevering toil. Urged by an ardent zeal that must stand for our excuse, I was, in company with a friend, one afternoon trespassing in a wood, despite the warning intimation "Trespassers Prosecuted." My friend had succeeded in finding three specimens of *Helix lamellata*, when lo there appeared on the scene the dreaded gamekeeper, or caretaker, and his attendant dog! The man was civil, however, as indeed I generally find such men to be when they meet with naturalists poaching on their domains. He was curious to see what it was for which we were making such careful search: by the help of a pocket lens, my friend delighted him, by showing what a charming little beauty of a shell tenanted his woods, and we got off with the conviction that the grounds were not guarded by a churl, who would be very severe on us if caught again inside the fence. But my object in mentioning *H. lamellata* was to encourage collectors who may feel disheartened by repeated unsuccessful attempts to find shells that they are in quest of. I had searched for this shell in its two local habitats not less than nine or ten times, and secured in all only three specimens; however, being in Colin Glen one day early in the present month (March), I made another effort to find this *Helix*. The second leaf I lifted yielded a shell, and then near three hours were spent without rising from this spot. The result was sixty-five specimens captured, before the approach of evening put an end to the search; but the shells were by no means exhausted; the number could have been doubled, had time permitted. Thompson mentions taking twenty-one specimens on one occasion in this same glen. *Helix lamellata* was the dominant form in this productive heap of beech-leaves; the associated species were *H. fulva*, *H. pygmea*, *Vertigo edentula*, some *Zonites*, and *Carychium minimum*, but none of these species was abundant. I think it is likely that much labour is thrown away looking for shells at the wrong time, and that there is for each species a season and weather, when it is out in greater force than usual. —*S. A. Stewart, Belfast.*

Wren's Nest at Christmas.—The *Brighton Examiner* notes the fact of a wren having built her nest at Beeding, Sussex: the bird commenced feathering it on Christmas day, and now (Jan. 26th) there are several eggs laid.—*D. C. Bate.*

BOTANY.

Winter Mushroom.—While Mr. Leeming, of Casterton, Westmoreland, was out this morning (Wednesday, February 17th), looking after his stock, he found in a meadow two mushrooms, each about six inches in circumference; and in point of flavour, they were, I can affirm from actual experience, equal to any I tasted last year, when they were so prolific.—*S. Morris.*

Capsella bursa-pastoris.—The plants usually united under this name seem to vary very greatly from one another, irrespective of soil or situation. The undersigned, who has been investigating this variation for a year or two back, would esteem it a favour if local botanists would kindly forward him specimens of the forms existing in their localities for examination and comparison. The specimens may be either fresh or dried, but should as far as possible have fully formed seed-pouches, and should be gathered with the roots attached. British or continental specimens will equally oblige.—*Charles P. Hobkirk, Honoria-street, Huddersfield.*

Potentilla.—There are several British species of this genus, some of them exceedingly pretty. The *P. fragariastrum*, for example, with its small white flowers, always attracts my eye, they look so like the wild strawberry bloom, and, as they appear in our hedgerows early in spring, I have often known children mistake them for the latter, exclaiming, "Oh, don't pick those, or we shall not have any wild strawberries." Then comes the "silver-weed," *Potentilla anserisna*, a roadside plant with yellow flowers and pinnate leaves, the leaves being easily distinguished by a soft white down which grows on them. Another member is the *P. fruticosa*, a rather rare northern flower, with yellow blossoms and pinnate leaves. The flowers of this species are not so large as those of the *P. anserisna*, and the plant is partial to shaded spots; is found mostly in bushy places. The cultivated kinds of Potentilla are so well known that they need no description here, and the *P. reptans* and the *P. formentilla* have already been noticed. I somehow fancy the flowers of the latter are smaller than those of the *P. reptans*, but as I am a very humble botanist, I will not presume to differ from W. Holland in regard to the difficulty of distinguishing between the two species in question, or venture to affirm that they are not the same under different aspects, soil, &c., &c.—*Helen E. Watney.*

Scolopendrium ceterach.—This plant was used as a bait for cod, just as a piece of red cloth is. Its under side is of a bright brown colour, and a little glossy, which makes it still more conspicuous when used as a bait. It is merely stuck firmly on to a hook and dragged after a boat, or sunk in deep water. It is no doubt mistaken by the fish for the sandworm which a good long frond carefully arranged on the hook somewhat resembles.—*H. W.*

Cochlearia officinalis is rather biennial than annual. It sheds its seed early in the summer, and the seedlings grow to a considerable size by the autumn, and flower the following spring. It might possibly under cultivation, and sown in the early spring, arrive at maturity within the year, but its habit in the wild state is such as I have detailed it. The *Cochlearia Danica*, which is, perhaps, only a variety of the former, is smaller, but thicker and more succulent in the leaf, and more pungent to the taste, and would, I think, be the best plant to cultivate for the table.—*H. W.*

Scurvy-grass (*Cochlearia officinalis*) is, as far as my observations extend (and I have now been living close to the seaside for the last two years), a perennial, and I therefore must beg to differ from Helen E. Watney as to her statement that it is certainly an annual.—*Samuel A. Brenan, Vicar of Cushendun.*

The Shamrock.—In answer to "S. A. S.," Belfast, respecting what kind of trefoil is used by the Irish, I have always found *Trifolium minus* the one preferred, and not *Trifolium repens*, as any black spot on the leaves is considered by the lower orders as a blemish. This I have observed in co. Dublin, Wicklow, Meath, Westmeath, Louth, Fermanagh, and this part of Antrim.—*Samuel A. Brenan, Cushendun.*

Sundew.—Withering (Botany, ed. III. 1796) states that his friends, Messrs. Whately and Gardom, witnessed the leaf of *Drosera anglica* curl over so as to enclose a fly, which had been previously entangled in the glandular hairs; the more distant hairs bending towards the victim to hold it more tightly. Roth (quoted by Withering) saw the same occurrence in Germany. Latterly an American entomologist gives an account of a like kind, in the *American Naturalist*. Will any entomological or botanical reader say whether he can confirm this singular phenomenon? *Drosera* (Sundew) is so nearly related to *Dionæa muscipula* (Venus's Fly-trap) that such a faculty is very possible. I never saw it myself, and Withering says that he failed in his experiments.—*W. W. Spicer, Itchen Abbas.*

Botanical Allusion in Tennyson.—Tennyson, in the first stanza of the 114th section of "In Memoriam," writes thus of the spring time:—

> "Now fades the last long streak of snow,
> Now burgeons every maze of quick,
> About the flowering squares and thick
> By ashen roots the violets blow."

Our laureate is usually accurate in all that he says about nature, and I should like to know, whether violets *do* occur more frequently under the shade of the ash than elsewhere.—*J. R. S. C.*

MICROSCOPY.

Pleurosigma hippocampus.—The habitat of this diatom is "marine or brackish water." I have never found it in fresh water, and am not aware of any authority for its being so found. In Pritchard's "Infusoria" it is described as marine; in Smith's "Synopsis" as of brackish water; in Kutzing's "Bacillarien" the locality given is the Baltic; Rabenhorst ("Die Süsswasser Diatomaceen") says that it (*Gyrosigma hippocampus*) is properly marine, but is found throughout Italy, Sicily, and the neighbouring islands along the coast in shallow water and brackish puddles (*halbsalzigen pfützen*); the "Micrographic Dictionary" says marine or brackish water. Will Mr. Kitton be good enough to say in which of the British so-called fossil earths this diatom may be found? The inaccuracies (Science-Gossip, 1867, p. 133) pointed out by your correspondent Mr. Warner were noted by me at the time in my copy of the Gossip; his corrections are right except as to fig. 142. Figs. 142 and 143 are both representations, evidently copied from Smith's "Synopsis," of *Pin. stauroneiformis* (S.), which I have sometimes found to vary much both in outline and absence or presence of central costæ.—*H. R.*

If Mr. Warner refers to the "Synopsis" he will find *Pleurosigma hippocampus* stated to be a brackish-water form. Pritchard's book states it to be a marine form, but refers to Rabenhorst's "Süsswasser Diatomaceen." I have found it in gatherings from Horning, Ormesby, Heigham — all fresh-water localities. It is probably like *Navicula amphisbæna*, and grows equally in fresh and brackish water. The references to the figures are, of course, wrong. *Pinnularia stauroneiformis* = figs. 142 and 143; *Pinnularia divergens* = fig. 144; *Pinnularia acro-asphæri* = fig. 141. It is a mistake to put much stress on the habitats of diatoms. I have *Terpsinoe musica* from barnacles scraped from a ship's bottom, and also from a fresh-water stream in the Mauritius: in both cases it grew luxuriantly. *Cyclotella punctata* is found in very brackish water, and also in water without a trace of salt; indeed, specimens I have are from perfectly fresh water. *Cyclotella Kutzingiana* is found under precisely the same conditions. See Dr. Arnott's paper in the *Microscopical Journal* on "What are Marine Diatoms?"—*J. Kitton.*

Pine Pollen.—The common pine here is, I believe, *Pinus pinaster*, which produces a vast amount of pollen, and which, with the flower scales, are pretty objects; the outer scales covering the flower are also interesting with low power. Some years ago the south wind brought quantities of pine pollen from the forests, and which was arrested by the rain-water standing in pools in the streets, and caused among many people no slight alarm, as they imagined there had been a fall of *sulphur*, and wondered what might crop up next.—*G. S., Oporto.*

Anatomy of the Fly.—A treatise on the Anatomy and Physiology of the Blow-fly, illustrated with eight coloured plates, is announced by Mr. B. T. Lowne; and, from what we have seen of it, this treatise promises to be an acquisition to microscopical science.

Vorticellæ, or Bell Infusoria.—Among the most common and yet most interesting of the Infusoria are the Vorticellæ, or bell animalcules. I have examined a great number of specimens of the *Vorticella microstoma* from the water in which hyacinth bulbs have been growing. They consist of a bell-shaped body attached to a thread-like muscular stalk, which anchors them to some conferva or unicellular growth. On being alarmed, the thread contracts into a spiral, and the ridges of the bell close over the mouth in an instant, making everything snug. A dark pith may be noticed running down the stalk. This Ehrenberg takes for a muscular fibre, but M. Dujardin, who seems as a natural consequence to combat Ehrenberg's views, supposes the outer layer to consist of contractile tissue. The row of cilia inside the bell keep up constantly a double whirlpool, causing two tides as it were to flow into the mouth of the bell, bringing the various spores or green granular matter always present in the water into the mouth of the bell, rejecting most of them again by what seems to be an anal aperture situated in the cell-wall above the ridge of the bell. I again and again observed some of these green granules slipped into the substance of the body, and gradually assimilated with it. This is more easily observed on mixing a drop of water coloured with carmine-lake, the granules being red, and the stream out of the exit aperture coming out like smoke from a chimney, discolouring the water for a considerable distance. The manner in which these animalcules multiply is very interesting. The body, at first rather elongated, taking the oval instead of the circular form, gradually the oval divides, and, taking the form of two circles pressed together, these gradually separate, the bell opens, lateral cilia appear on the sides of Vorticellæ, and finally it separates altogether and swims off to hang on its own hook, or rather its own thread. I certainly observed nothing in the way of an alimentary canal, and many of the nuclei appeared to me to be nothing but the granules present in the water, and taken in the body as nourishment. I observed other nuclei of more regular appearance brought out distinctly by the carmine, and which separated at the division of the body, and they seem probably to be nuclei or germs of the separated animalcule. As this is the season of the year when the Infusoria can be so easily obtained, they should be examined by all able to do so, and as much light as possible thrown upon their somewhat obscure organizations.—*H. Ashby, Portlaw, co. Waterford.*

NOTES AND QUERIES.

Fruit of the Hawthorn.—The word *cat-haws*, inquired about in Science-Gossip, p. 70, is evidently allied to *cat-kin*, the diminutive of *cat*: it is applied to the pendulous blossom of some trees, from a fancied resemblance to a kitten's tail, and hence extended, as your correspondent informs us, to the "fruit of the hawthorn."—*A. Hall.*

Hair and its Restorers.—In the present day, when the human hair is the object of so much attention to the fair sex, the following receipts, taken from the work alluded to in your last number, by Samuel Purchas, 1657, may be read with interest:—"Pound bees dead and dry in the combs: mingle them with honey, and annoynt bald places of the head, and the hair will spring afresh." "The ashes of bees ground with oyl make hair white." "Water distilled of honey four times by a limbick, so that the honey were first boiled, makes beautiful hair, and the hair wet therewith doth not only become yellow, but softer, and increaseth likewise, especially if it be done in the sun."—*W. J. Iliff, Epsom.*

Habits of House Mice.—Some few years since, I had a regular nightly visitant to my bedroom, in the shape of a singing mouse: it came *booming* round the apartment with such vocal power that, after the first novelty had worn off, we voted it a nuisance, had a cat, and soon heard no more of it. I have now another visitant, a much quieter animal: it *rustles* about a good deal on first entering, but after a while subsides into a gentle and very peculiar murmuring sound: it is soporific, a constant sibilation without any *l* in it; a hushing *musing* sound; a perpetual *sh' sh' shiver*. And here is a great and wonderful analogy, it is really *mussitating, i.e.* "to gently murmur," that mysterious word, from *musso, mussare*, quasi μυσσο, that has given us the "lulling" theory of the historical name *Lollard*. This analogy of *mus*, a mouse, and *mussito* is really very close. I would ask your naturalistic readers to define the *singing* of a mouse, and also the murmuring above named—how are they produced, and how far universal among the *muridæ*.—*A. Hall.*

Hybernation of Bees.—I see that your correspondent, Mr. A. Hall, has some doubts about the hybernation of the humble bee. My own experience goes to corroborate Mr. Mill's discovery. Whilst pupa-digging last month (February) I turned up a humble bee in a very torpid condition. I very much regret that the pupa-digger had mutilated his cell, so that I could not accurately determine whether an entrance did or did not exist: there was no stone on top, and, as far as I could see, it was merely a cell rudely dug in the earth without any attempt at smoothing. The bee was on its back, not, as in Mr. Mill's cell, on its side. As to Mr. Hall's theory, that the bee had been involuntarily confined, I regard that as quite out of the question. With regard to question 4, I think that bees could exist for a length of time without air and food, or at least with only as much air as could penetrate through the soil. I know that I have this winter dug out, at the root of a tree in stiff and clayey soil, a newt, at the depth of at least three inches below the surface: this newt, though at that time very sluggish and almost lifeless, is now a lively inhabitant of my aquarium. If *he* could thus endure hunger and want of air, why not a humble bee? I think that it would be very interesting if some of your correspondents were to keep, during the ensuing summer, a colony of humble bees. This would not be a difficult task; a flower-pot partially filled with mould and covered with gauze, would serve for their habitation. The results, I am sure, would be interesting. The formation of the winter cell could then be clearly seen, and Mr. Hall's doubts satisfactorily cleared up. The only singular point, however, in my opinion is that it does not appear to be noticed by entomologists. Westwood (introduction to Mod. Class., vol. ii., page 281), says "they form societies of about fifty or sixty individuals, occasionally, however, amounting to two or three hundred. They construct their dwellings underground in meadows, pastures, or hedge-rows, generally employing moss for this purpose . . . . *A few impregnated females alone survive.*" Here he speaks of their making common dwellings, but altogether omits the fact of their constructing solitary ones. He alludes to a few females surviving till the spring, but is surprisingly silent on the subject of their forming any dwelling in which to brave the inclemency of the winter. The only reference I can find to their hybernation is in Maunder's "Treasury of Natural History," page 332:—"These (the larger females) live in a sort of chamber *distinct from the rest*, but, as it would appear, *without any supply of food*." I earnestly hope that these short remarks may stimulate the readers of Science-Gossip to investigate further this very interesting subject.—*H. H. O'Farrell.*

Leeches.—I have on many occasions been obliged to avail myself of the services of leeches, and, feeling thankful to them for the relief they have afforded, have always been pained at the torture they are made to endure by salt, squeezing, &c., to make them disgorge the blood they have swallowed. Some short time since, on using them, I determined, in the face of strong prejudice, to see if I could keep them alive without using any of the means alluded to, and, as yet, have succeeded in doing so. I was told it was cruel kindness, for they *might* live after the salt, but must die without; but I am glad I persevered, as I think I shall be able to prove the fallacy of the popular belief. When they *do* live after being subjected to the salt process, they are poor shrivelled things, with indentations on the skin wherever the salt has touched. Mine, after being well washed, were put in a globe with cold water, plenty of sand at the bottom, and some *Anacharis*, with water-snails, water-shrimps, water-fleas, &c.; and some antiquated leeches which we have kept as our "clerks of the weather." I should be glad to know whether any one else has tried to do away with what is, I am convinced, a needless piece of cruelty to a creature so valuable to suffering humanity.—*H.*

Origin of Life.—A succinct account of this subject is presented in a small French volume just issued under the title of "L'Origine de la Vie," by Georges Pennetier. It contains the case stated on behalf of spontaneous generation, with the objections of the panspermists, and may be accepted as a summary of the discussions between Pasteur and Pouchet, and their several adherents. There is a good *show* of cheap woodcuts, which is accomplished by repeating them over and over again, sometimes three or four times. This is hardly a commendable way of "making up" an illustrated book, which we do not advise our English publishers to follow.

Butcher's Broom.—I have observed the Butcher's Broom (*Ruscus aculeatus*) in bloom, and forming berries all this winter. Can any of your readers inform me whether this is unusual, or if it is due to the mild season? A friend of mine put a piece of this plant into water last Christmas, being then in flower: it has since formed and ripened several berries, though not so large as usual. As this appears to me unusual, I thought it might interest some of your readers.—*W. O.*

Fish-Moth.—Could you cause me to be informed, through the pages of your valuable journal, the scientific name of a small insect called the fish-moth about here? It is wingless, rather like a shrimp in form, and is found in old houses, being very destructive to silk and woollen fabrics.—*W. O.*

Use of Stones by Spiders.—Upon this curious circumstance, referred to in February, page 47, I offer another anecdote, corroborative of the fact, which few may have seen, as it appeared in the *New York Gardeners' Magazine* of the year 1841. A gentleman states thus:—"On passing along one of my garden walks in Brooklyn the other day, I discovered a spider's web constructed rather singularly: it was suspended from a cherry-tree, being attached to the trunk, and running out, with numerous fastenings, at different distances, on a large limb, which rose at an angle of perhaps thirty degrees from the earth. This you may suppose would make the web of rather a narrow triangle, and one not likely to bring its proprietor much custom. To enlarge its sweep, however, the spider had, by some means or other, formed a corner downwards, and suspended from it a little stone—say half an inch in length, three-eighths in width, and one-eighth in thickness—well secured in parachute style, and hanging some eight or ten inches below. This weight kept the web taut, and swung slightly as the wind affected it, and there it remained for several days. I had some curiosity to know more of the projector of this contrivance, and on casting my eye near the tree, where the thickening fabric indicated his nest, I discovered a spider with a body nearly spherical, of the size of a small cherry, with crab-legs, and in all respects appearing ready for business. I touched him slightly with a little stick, upon which he made a motion towards it so sudden and so impassioned as wellnigh made me jump, at the same time striking the stick in such a manner as inclines me to think that had it been animated it would have felt its venom." The latter part given seems to savour of the romantic, since English spiders usually feign death or run away when thus attacked, but the idiosyncrasies of Transatlantic individuals may lead them to act differently. There is no doubt that stones or other weighty substances are sometimes used by spiders in order to get the equipoise they need.—*J. R. S. Clifford.*

Spider and Stone.—With regard to the stone suspended from the spider's web, as observed in Scotland, and of which I gave an account in the last December number, I have since been told by the person who noticed it that, besides the long thread to which the stone was attached, there were several cross threads connecting it with one of the trees, and ranged at about equal distances one above the other. This wonderful arrangement was no doubt, as one of your correspondents has suggested, a means of keeping the web steady and distending it.—*J. F. D.*

Christmas Berries.—The writer of the article pp. 13 and 14 of this year's volume must excuse my saying that mistletoe has no right to a place among *Christmas* berries. In Herefordshire, where it is most abundant, and where the customs connected with it are tenaciously adhered to, it is associated exclusively with the new year. The reason for this, and a very full and clear account of the mistletoe and every thing connected with it, are to be found in the "Transactions of the Woolhope Naturalists' Field Club" for 1864. In that paper will be found a complete list of all the oak-trees on which mistletoe is at present known to grow, and of all the kinds of tree on which it has been found. It is *less* frequent on the oak than on most other trees.—*T. W.*

Moth Courtship.—One day last July, whilst watering our garden, I noticed a couple of the common vapourer moths (*Orgyia antiqua*) whirling round and round my head. Thinking this peculiar, I stopped, and, moving to one side from the engine which I was using, found that *it*, or *something on it*, was the centre of attraction. After fluttering about for some time, they reached the nave of one of the wheels, and there alighted, when, upon stooping down, I saw on the under side of the nave, in the angle formed by it and a couple of spokes, a female of the same species, in the act of emerging from the pupa-case: so I pill-boxed the two males already there, and by that time two or three more had arrived. These I also pill-boxed, and then, having removed the female, who had now quite freed herself from her shroud, to another pill-box, which I placed on the ground at a short distance from the engine, I waited to see if any more males would make their appearance, and, if so, whether they were attracted by *scent* or *sight*, and I think that I have pretty clearly proved that it was by the *former*, and that from the *case*, and *not the moth*; for, though she was in an open box not more than a couple of yards from the pupa-case, no more males took any notice of *her*, while nine or ten hovered about *the empty case*, and seemed to be looking in all directions for her to whom they wished to pay their addresses. With the vapourer, scent given off from the pupa-case would be quite sufficient as a guide to the whereabouts of the female, since her wings are so small that they must be completely useless to her as a means of locomotion. This is a parallel to the instance of "moth courtship" mentioned by "T. E. F." at p. 166, Vol. IV. of Science-Gossip, though not quite identical, for "T. E. F.'s" observations were on the buff ermine moth (*Arctia lubricipeda*), and the *moth*, and *not the case*, was the attraction. Possibly this property of *scent possessed by female pupas and imagos* (?) may be turned to account by using them as "bait" for males.—*J. W. G.*

Case Insect.—"R. G.'s" aquatic larva, living within a case of pieces of the leaves of *Potamogeton*, is probably that of *Hydrocampa nymphealis*, which lives between two pieces of leaf united at the edges. The eggs on water-plants are those of *Sialis lutaria*. —*R. McL.*

Cat-Haws, &c.—As your correspondent seems to think that the local name Cat-haw is peculiar to the East Riding, it may not be uninteresting to him to know that it is generally used in the North Riding also. The scarlet point of the hedge rose in the same locality is called "cat-jugs."—*W. Wheldon.*

Alas poor Dragon Fly! —A Plea for Science Schools.—On the 1st of March, just as I was starting for the railway station, the March number of Science-Gossip arrived, which I put in my pocket, together with that morning's *Standard*, to read in the train. Having glanced over Science-Gossip, I was about attacking the *Standard*, when a fellow-passenger asked permission to see the journal, and was soon deep in its contents. Reading the newspaper, I came, *inter alia*, to an article on Mr. Sykes's Bill for the protection of sea-birds, with which I agreed until I reached the following statement:—"It has been calculated that a gull on the wing will devour from sixty to seventy dragon-flies a minute, and each one of these might otherwise deposit larva sufficient to destroy before fruition a handful of corn." Turning to my fellow-traveller, who had expressed his satisfaction with your March number, I said, "What do you think of that?" "Very strange, is it not?" was the reply. "More strange, if true," said I, "for, leaving out the blunder of larva for larvæ, how could creatures which spend the egg, larval, and pupal state in water possibly devour a handful of wheat, either before or after fruition? Besides, who has calculated the number of possible dragon-flies devoured per minute by a gull on the wing?" See the mischief done by one who, ignorant of natural history, attempts to teach, through the public press, a lesson on dragon-flies. Enough, we would have thought, for them to bear the unenviable title of "horse-stingers," and to be held in dread, as they are in this country, because their "sting is wus nor that of ten harnets," without the equally false accusation of destroying grain being laid at their door. In his semi-knowledge, the writer has mixed up some form of *tipulæ*, perhaps the Hessian fly, and then, taking the dragon-fly for his text, has cast a slur upon a friend, not a foe, to the farmer. Writers of this stamp prove the need of science schools and the utility of such publications as Science-Gossip to correct, or at least clear up, such mysteries as the "chignon disease," *genuine* "mosquitoes," and "humming-birds" in England, and the *discovery* (?) of snow crystals in 1869.—*T. W. W., Brighton.*

Fungia patellaria.—When searching for fossils in a carboniferous limestone quarry a few days since, I found a mushroom coral, or what I believe to be one. It is about one inch diameter, and in good condition. This being the first coral of the kind I have found in the limestone, I should be glad to know if this variety of coral is common to it.—*T. R.*

Daddy-long-legs.—If "S. B. J. S." will look out next September, he will probably find the host whose "feckless" antics so surprised him to consist chiefly of the female tipulæ parting with their eggs. Some years ago I saw such a host, but they were ranging along over a grass field in short flights, going all *with* the wind. Each insect after seeming to rest for a few seconds would be off again a yard or two, then another halt, and so on. Catching some of them I found they were females, and that they were discharging eggs at intervals corresponding with their short flights. The action seemed involuntary, as it continued even when the insect was held—the black polished eggs being one by one brought to the end of the ovipositor, and, by compression of its divisions, thrown out with a sudden snap, just as the segments of the carpel of the pansy jerk out, by contracting upon them, the smooth polished seeds. —*H. B. Biden.*

Spirorbis.—If your correspondent's small spiral shells found on the casts of fossil ferns be air-breathing gasteropods, they are not the first that have been found. I have had a specimen of fern in my cabinet for two or three years on which are a number of these *Spirorbis* (a name which I see no reason to alter). Mr. J. W. Salter, W.G.S., makes mention of them in the *Geologist* of 1861. At p. 181 he says:—"Attached to the plants that lie among, above, and beneath the shell-beds, is found abundantly a little sea-worm, or, rather, the spiral case of a sea-worm (*Spirorbis*), which is well known now upon sea-wrack and kelp, as it was upon floating leaves and plant-stems in the coal period. It is called *Spirorbis carbonarius*, from its habitation in the coal." Of the marine origin of this little shell I feel no doubt. In the shale in which my specimen was found are vast quantities of fish remains of several species, and the same species of fish are found (but in another seam of coal) associated with the *Nautilus*, *Goniatite*, *Orthoceratite*, *Avacula-pecten*, &c. &c., which are all recognized as marine shells. Mr. Salter makes mention of land-snails found by Professor Dawson and C. Lyell in Nova Scotia; but they were very different from your correspondent's.—*John Butterworth.*

A Geological Puzzle.—The late storm made a clean sweep of the beach at Ready-Money Cove, Fowey, disclosing the singular triune formation of its structure—the lower stratum being blue clay; the next an alluvial marly deposit, about a foot thick, on which once grew a green coppice wood; and over that another stratum of blue clay—the three layers belonging to various periods, the middle, or vegetation streak, a mosaic of roots, stems, and branches, being totally different from the epochs which produced the upper and under crusts, the whole being under water at high tide.—*W. B.*

A Sand Query.—When at the Sussex coast, in the autumn of 1866, I observed a curious appearance in the sand, which I am quite at a loss to explain. On turning up the sand, though it might be only to the depth of an inch or two, it appeared of a decided *pink* colour, while the water which flowed into the hole exhibited the same hue, and in even a more marked degree. The mere impression of one's foot on the sand produced the red appearance, though where the sand was untouched it was quite of the usual colour. Could this have been due to the presence of any microscopic vegetable?—*D. H. Scott.*

Mole Cricket.—If your correspondent "E. M." will refer to the second volume of Kirby & Spence's "Entomology," or the cheap edition of the introduction, published by Longmans, in one volume, he will find in the twenty-fifth letter ("On Luminous Insects") the only authority I believe there is for supposing that the mole cricket is luminous. The writer of the letter there says:—"A learned friend (Dr. Sutton, of Norwich) has informed me that when he was curate of Ickledon, Cambridgeshire, in 1780, a farmer of that place, of the name of Simpringham, brought to him a mole cricket (*Gryllotalpa vulgaris*), and told him that one of his people seeing a jack-o'-lantern, pursued it and knocked it down, when it proved to be this insect, and the identical specimen shown to him." The anecdote forms the text of a somewhat fantastic story in the third series of "Episodes of Insect Life," in which the mole cricket is made to perform the part of jack-o'-lantern.—*H. F. H.*

NOTICES TO CORRESPONDENTS.

E. M. H.—The zoophyte is *Salicornaria farciminoides*. The fungus is *Illosporium carneum*. Shall be glad of further specimens.

Capt. N.—The specimen sent is doubtless a shore-washed polyzoarium of *Cellepora pumicosa*. Johnst. Br. Zooph. i., 295, pl. lii. Busk. Marine Polyzoa, 86, pl. cx. The other object could not be found.—*P. H. G.*

E. T. D.—The Butterbur and Coltsfoot are early flowering plants, and this season is no guide.

L. F. R.—Why not try thin paper (hand paper or tissue) and then pack in cotton wool?

T. W.—We do not remember to have seen a portable, cheap, and satisfactory manual such as you require.

F. M. G.—Enough of "Lamperns."

J. P. G.—Has no ground of complaint against Mr. Hepworth for plagiarism, he simply illustrated a well known law.

MERE.—A note with this heading and no signature has gone into the paper basket.

E. M.—No insinuation was intended that your seed was any other than that called *Eschscholtzia tenuifolia*; the question raised was one of botanical consanguinity.

J. F. D.—Your primrose was an example of synanthy or union of two flowers, à la Siamese twins.—*M. T. M.*

J. M. P.—Geranium seeds coil up in the same manner.

J. F. R.—Another instance of Siamese twins.

W. W., S. A. B., R. S.—Will correspondents kindly remember our request, and write on *one* side of the paper only?

W. W.—*Galinsoga parviflora* is a South American plant, belonging to the Compositæ.

M.—It has been done often and well.

J. M. Martindale, Staveley, Kendal, desires the address of Miss Gore, lately resident at (place illegible) Cornwall. Also he states that the list of lichens desired by Rev. J. M. Crombie is ready, and wishes to know where it can be sent.

G. C. will find all he requires of references in Bate & Westwood's "Sessile Eyed Crustacea," Vol. i., p. 16, under *Talitrus locusta*.

G. F. P.—Apply to Dr. Wallace, Colchester, Essex.

S. M. P.—We have examined the original note, and find the writing to resemble "Garrett" more than "Yarrell." If contributors will not endeavour to write names and technicalities plainly and legibly they have no cause to blame the printer.

W. P.—Are you simple enough to believe the facts (?) as you state them?

X. Y. Z.—ENQUIRER.—Notwithstanding our oft repeated notices, correspondents continue to send queries, &c., without their name and address. Of course we persist in condemning them to the paper basket unanswered.

J. F.—1. *Asplenium* in a young state. 2. *Adiantum formosum*. 3. Too young to decide. 4. *Selaginella martensii*. 5. *Pteris serrulata*. 6. *Pteris cretica*. 7. *Pteris scaberula*.

Y. D.—The copyright of a magazine or journal is vested in the Proprietors. Original communications published in such magazine form a portion of the copyright, and the proprietors can appeal to the law for protection from piracy.

A PIECE OF COAL.—We have not space to devote to a continuation of this controversy.

L. S.—Florets of the disk assume the character of ray florets. Stamens often suppressed.

W. F.—Professor Rymer Jones's General Outline of the Animal Kingdom, £1. 11s. 6d. (Van Voorst, 1855.) "The Animal Creation," by the same author (Soc. P. C. K., 1865). 7s. 6d.

F. K. D.—See SCIENCE-GOSSIP for 1866, pp. 22 and 282.

C. A. C.—4. *Polypodium vulgare*. 5 and 6. Seedlings of *Scolopendrium vulgare*. The rest being seedling, *barren* fronds, we shall not attempt to name.

B.—The correspondent who contributed botanical papers to SCIENCE-GOSSIP under this signature was Mr. James Britten of High Wycombe, who now signs his communications in full. Paper on "Cranes'-bills" promised for the May or June number.

W. E.—1. *Dicranella heteromalla*. 2. *Hypnum tenellum*.—*R. B.*

J. C. D.—1. *Hypnum cupressiforme*. 2. *H. denticulatum*. 3. *Dicranella heteromalla*. 4. *Thuidium tamariscinum*.—*R. B.*

T. W.—1. *Thamnium alopecurum*. 2. *Homalia complanata*. *R. B.*

H. F. Parsons.—1. *Didymodon cylindricus*. 2. *Trichostomum crispulum*. 3. *Plagiothecium sylvaticum*. 4. *Tortula sinuosa*. 5. *Trichostomum tophaceum*. 6. *Bryum pseudotriquetrum*. A further supply of No. 4 and No. 1, with ripe fruit, is requested.—*R. B.*

EXCHANGES.

BUTTERFLY AND MOTH EGGS, wanted for a consideration.—E. Hinton, 42, Grafton Road, Holloway.

SHEEP'S KIDNEY, well injected with carmine (unmounted), for sections of apple tree, bamboo, or scales of Podura.—M. D. B., Beauchamp House, Leamington.

HELIX LAMELLATA.—A few will be given for living specimens of *Limnæa stagnalis, auricularia, glabra, glutinosa, Planorbis, Assiminea, Bythinia, Paludina, Neritina, Dreissena*, or *Cyclas*.—F. B. W., 3, Albert Place, Perth.

DIATOMACEOUS EARTHS.—Diatoms, Foraminifera, &c., send lists of duplicates to R. T. Andrews, Castle Street, Hertford.

BRITISH PLANTS, for fossils from any formation.—James Cracknell, 1, Paul's Cottages, Chiselhurst, Kent.

BRITISH LEPIDOPTERA for fossils or foreign shells.—S. S., Post Office, Faversham.

MELITÆA CINXIA, larvæ this month, pupæ in May, for ova, larva, or pupa of any other species.—W. Jordan, Binstead, Ryde, Isle of Wight.

LEPIDOPTERA during the season, in exchange for British Bird's Eggs.—W. Jordan, Binstead, Ryde, Isle of Wight.

PARASITES FROM GOLD PHEASANT.—Send stamped and directed envelope to T. E. Gunn, 21, Regent Street, St. Giles Road, Norwich.

POLLEN OF PINUS PINASTER from Portugal.—Send stamped and directed envelope to "Oporto," care of the Editor of SCIENCE-GOSSIP, 192, Piccadilly.

DREDGES.—Two small dredges offered for British Birds' Eggs or land and fresh-water shells.—R. H. Smith, 19, Jerrard Street, Halifax.

BOOKS RECEIVED.

"Land and Water." Nos. 162, 163, 164, 165.

"Scientific Opinion." Nos. 17, 18. London: Wyman & Sons.

"Memoir of the Life and Labours of the Rev. Jeremiah Horrox, Curate of Hoole, near Preston, to which is appended a Translation of his celebrated Discourse upon the Transit of Venus across the Sun." By the Rev. A. Blount Whatton, B.A., LL.B. London: W. Macintosh.

"Vital Law." London: Longmans & Co.

"The Gardener's Magazine." Part XXXIX. March, 1869. London: E. W. Allen.

"The Dental Register." Vol. XXII. No. 12. Dec. 1868. Vol. XXIII. No. I. Jan. 1869. Cincinnati: Wrightson & Co.

"Quarterly Journal of the Folkestone Natural History Society." No. 2. March, 1869.

"The Life of the Trichina" By Rudolph Virchow, M.D. Translated by R. K. Browne, M.D.

"American Bee Journal." Vol. IV. No. 9. March, 1869. Washington, N.S.

"The Monthly Microscopical Journal." No. 3. March 1869. London: R. Hardwicke.

The American Naturalist. Vol. II. No. 12. Feb. 1869. Vol. III. No. 1. March, 1869. Salem: Peabody Academy of Science.

"The Origin of the Seasons, considered from a Geological point of View." By Samuel Mossman. 472 pp. sm. 8vo. London: W. Blackwood & Sons.

"A Guide to the Study of Insects, and a Treatise on those injurious and beneficial to Crops." By A. S. Packard, Jun., M.D. With upwards of five hundred engravings. Parts I. to V. Sept., 1868 to Jan., 1869. Salem: Press of the Essex Institute.

"The Canadian Entomologist." Published by the Entomological Society of Canada. Vol. I., Nos. 1 to 6. August, 1868, to January, 1869. Credit, Ontario, Canada.

COMMUNICATIONS RECEIVED.—H. W. L. T.—W. C.—A. H.—E. E. N. (all over).—M. B. D.—J. S. (thanks).—H. R.—W. W. S.—F. M. G.—W. I. I.—W. C.—E. T. D.—W. W.—A. B.—L. F. R.—T. W.—F. B. W.—J. B.—M. D. B.—J. P. G.—E. H.—T. W.—H. C. R.—J. S. T.—H. H. O. F.—W. H. D.—H. E. W.—H. B. B.—E. A. N.—T. W.—R. Y. G.—M.—D. H. S.—F. W.—O. E. D.—S. A. B.—L. H. F.—J. A. M.—J. R. S. C.—G. S.—W. E. H.—J. W. M.—H. F. P.—J. B.—E. H.—J. H.—J. E. H.—F. W.—Y. D.—W. B. L.—R. E. O.—T. R.—J. C. D.—H. A.—S. A. S.—G. F. P.—J. C.—H. W.—J. F.—W. B.—W. E.—L. S.—R. McL.—E. M. H.—A. B. C.—R. T. A.—W. H. H.—J. B. B.—R. H.—G. S. (Oporto).—A. L.—S. M. P.—G. B.—J. E. M.—R. M. M.—F. T.—C. K.—S. S.—McA. O.—R. H. S.—E. J. S. C.—D. M.—A. A.—C. A. C.—W. P.—C. A.—L. G. M.—T. E. G.—W. J.

THE WHEEL ANIMALCULE.

SOME years ago I purchased an eighteen-inch propagating glass, and, taking time to think well over and prepare the best materials for furnishing and stocking it (with the particulars of which I will not trouble you, as I do not think they have any special bearing on the present subject), I eventually set it to work. For several years all went on in the usual jogtrot way—weeds over luxuriant, especially the willow moss (*Fontinalis antipyretica*), which successfully quarrelled with all others; snails fat and prolific; and newts as happy as their meditative natures will permit; add a few common diatoms, entomostraca, and vorticella, and, so far, I think you have all. But I was to receive a better reward for my trouble. One fine April morning, having an hour between breakfast and "bus," I took the shade from the microscope, and, there being no better object at hand, put a scurfy-looking leaf of Anacharis in the live-box under an inch and a half objective, when, to my utter astonishment and unbounded delight, I counted eight specimens of the *Stephenoceros Eichhornii* and three of *Floscularia ornata*—prizes I had tried for in vain for years past. Another and another leaf I examined with equal success: the water, or rather the plants, swarmed with them. The hour too soon gone, I left them, but only to renew their acquaintance during that and many subsequent evenings. I soon discovered that they were perfect giants of their race. The only published drawings I have seen that did justice to them are those of Mr. P. H. Gosse, in the first two numbers of the *Popular Science Review*; the portraits of all others seem to me to have been taken from half-starved or dead specimens, from many of which it is really difficult to recognize the living animals. During the summer and autumn they continued in equal abundance, the Stephenoceros, however, keeping the lead. Almost as suddenly as they came they disappeared, and left behind them, on almost everything in the aquarium, innumerable quantities of their winter eggs, statoblasts. The winter past, indoor residence and spring sunshine warmed these into activity, and, if possible, I think there were more this second than the first season; but the order of precedence was changed, and the late opposition Floscularia had it by a large majority. Amongst these now appeared, sparingly, another candidate for favour, the curious little *Melicerta ringens*, which, to make the story short, the next or third year, drove out with the exception of a solitary individual here and there, the other two. How about the struggle for existence that Mr. Darwin tells us about? It must have been sharp, short, and decisive in this case.

I have said thus much on these three tube-bearing Rotifers, as they were to me the most interesting; but there were several of the free-swimming species in equal abundance and size, and on submitting a bottle of the contents of my tank to a gentleman who had made this class of objects his study, he pointed out several specimens which he called the Yellow Salpæ, but did not give the scientific name, and I omitted to take any notes or drawings of it. It was very like *Salpina mucronata* as figured in Prichard's "Infusoria," and which he said he had only seen once, and that sparingly, during the previous twelve years.

But it must not be supposed that wheel animalcules were the only inhabitants of my aquarium. On referring to my drawings, I find large trees of *Vorticellina*, of the genus *Carchesium*, others living in single blessedness, and producing their budding progeny in the most grotesque ways imaginable. There were plenty of well-to-do-looking *Stentors*, several of the tube animalcules, one fellow especially who was a general favourite (*Vaginicola crystallina*). Put into a small zoophyte trough, he would expand

his double (dividing) head, set his wheels in motion, to the delight of the observer, when suddenly he would stop them, pause, as if listening to the approval, shake his heads in a most ludicrous manner, then suddenly disappear within his castle to return after a time and repeat the performance. My drawings further record the presence of *Actinophrys sol*, Amæbæ, the slow-stepping water-bear, some of the less common diatoms clinging to the rock-work and weeds, two or three species of desmids, and plenty of the Algæ with their moving spores. I witnessed numberless cases of their singular reproduction, some no doubt normal, and sufficiently curious, others so remarkable that it would have been strange indeed if a malformation, or, as some would say, a variety, had not been the result. All the last-described forms were as abnormally (?) large as the Rotifers, and it really required more than a hand-magnifier to see them to perfection.

I wish it to be understood that the vegetable and lower forms of animal life retained a uniform character during the three years. Not so the Rotatoria. A different species had the ascendency each year—a remarkable fact for which I cannot satisfactorily account: it was certainly not due to any alteration in the management of the aquarium.

Once and again I supplied my friends with weed and water, and I started several juvenile aquaria myself, with the hope of being better able to watch the habits of my live stock; but they would not take kindly to their new homes, and generally vacated within the fortnight. At the end of the third year these beautiful creatures vanished, "like the baseless fabric of a vision," and have never since returned. I often wondered why they remained so long, their frailty being such that only the wisdom of an Almighty Creator could adjust means to an end so delicate as to insure their preservation.

It seems to me that the following questions are suggested by the facts I have related; and that on the correct answers to these questions will depend the success of any one who tries to produce a like result:—

1. How did the organisms described get into the aquarium, previously barren of anything of the kind, and live and propagate for so lengthened a period?

2. What was the cause of their increasing in such unaccountable numbers, in a space so comparatively small; and how came they so unusually large in size?

3. Where is to be found the reason for one species of the Rotatoria being more abundant one year than another?

I will give my answers to the two first of these questions. They may not be correct; but may help others to find the true ones. As to No. 3, I fail to make a rational guess.

1. It is my custom to throw all suitable gatherings from the various localities I visit, when I have otherwise done with them, into my aquarium, and let the weed remain for a week or so, and then remove it. A collection made on a charmingly fine early spring day of the first of the three years, from a pool half covered with *Ranunculus aquatilis* in bloom, was so treated. I could scarcely have failed in detecting Rotifers on this weed had there been any; but a few of their statoblasts would easily escape notice. I believe, therefore, that I got them in this gathering, especially as I noticed that the creatures were far more plentiful on the Ranunculus than on other weeds. But others, and myself subsequently, have knowingly put the tube-bearing Rotifera into their tanks only to see them die out in a week or two; why, then, did those under notice become acclimatized and prosper? Because the statoblasts, and not the adult animals, were used; and those were gathered so early in the year that the change did not affect them. I have two facts in support of this—the failure in the attempt to stock either my friends' or my own tanks with the adult animals with the unusually fine and healthy specimens at my command; and the statement of a correspondent in the "Annals of Natural History," some years after I had formed this opinion, to the effect that he never failed to stock his aquaria with freshwater polyzoa, if he obtained for that purpose the statoblasts on some fine *winter's* day, or *early* in the spring, but could not succeed with the mature animals.

2. At the time when our Rotifera and their retinue made their appearance, I was watching the habits of certain freshwater fish, and paid great attention to their commissariat department, taking care that they had plenty to eat. This consisted, chiefly, of white of egg and vermicelli soaked in water. Now, I believe in the cloud of minute particles given off by the latter, and fragments from the eggs, my visitors found a bountiful and suitable table, and they were content. I ceased to keep the fish in the summer of the third year, and the vermicelli, &c., was discontinued: you already know that it was in that year the animal life entirely died out. It now only required the application of the general law of abundance or scarcity of the necessary conditions of life to understand why they increased so rapidly, and were such model specimens of their kind, and as suddenly disappeared.

No arguments are needed to prove how much pleasure I had, or how much knowledge I gained, during the three years' stay of my lowly friends. That you may not forget it, I again repeat, that what has been done may be done again. Go and try, and let us know the result.

W. H. Hall.

South Hackney.

IMPERFECTLY DEVELOPED PLANTS.

SPECIMENS of monstrous plants have been sent to me from time to time during the past year and a half, with a request that I would describe them in the pages of SCIENCE-GOSSIP; and as the list is now becoming rather a long one, I will fulfil my promises, and put them together in the form of a paper. Some of the examples sent, and others which I have found myself, are very interesting additions to those I have already described, as they illustrate one or two new facts; though, no doubt, in many monstrous flowers there is a great similarity, as in most cases they chiefly show that there is a tendency in complex parts to revert to more simple ones, and for all organs to revert to leaves; the difference being, in fact, in the *amount* of change that has taken place.



Fig. 58.

The first example is a single Foxglove-flower, which was sent to me from High Wycombe in June, 1867; it is represented in figures 58 and 59. The calyx consisted of five sepals, which were somewhat larger and more leaflike than usual. The corolla was split open (naturally), and a bunch of flower-buds and bracts took the place of the ovary. Some of these bracts were coloured like petals. In fig. 60 all the parts which appeared to be made out of the ovary are removed. The flower then was found to contain only two stamens, but the other two seemed to have been converted into flower-buds. There was such a confusion of buds, leaves, and petals, that I made an ideal section (fig. 61), which will explain the real structure of this curious anomaly more clearly.

The flower-buds which took the place of ovules were perfect in every respect, containing corolla, four stamens, and a pistil. The one flower had, in fact, become a complete spike, or a Foxglove *plant* in miniature.



Fig. 59.

The structure of this flower leads to the conclusion that ovules are altered *buds* in the axils of

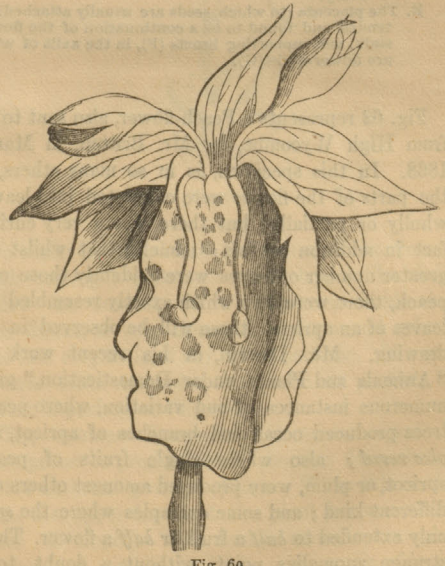


Fig. 60.

suppressed leaves; and in support of this view we have some curious instances where the alteration

always takes place partially, not in a flower, but in a branch, as in the little bulbs found in the axils of the leaves of *Cardamine bulbifera* and *Lilium bulbiferum*, which I referred to in a former paper when speaking of viviparous plants. These little bulbs appear to be an attempt at the formation of seed without the agency of flowers; or, to speak more correctly, perhaps, they are the first process in the formation of seeds from buds.

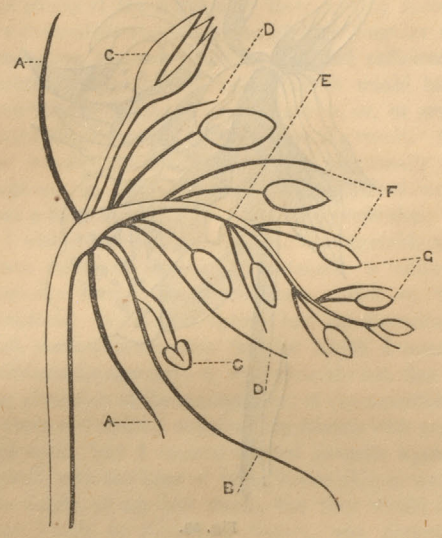


Fig. 61.

A, A. The calyx. B. The corolla. C, C. The stamens.
D, D. Carpellary leaves, which, under ordinary circumstances, would have joined together to form the ovary.
E. The placenta (to which seeds are usually attached) extended and found to be a continuation of the flower-stalk, and supporting bracts (F), in the axils of which are flower-buds (G).

Fig. 62 represents a Peach-flower, also sent to me from High Wycombe, by Mr. Britten, in March, 1868. In this specimen, as in so many others, all the parts of the flower were converted into leaves, wholly or partially; but there was a very curious fact in addition to this; namely, that whilst the greater number of leaves were evidently those of a peach, there were two which exactly resembled the leaves of an apricot: these will be observed in the drawing. Mr. Darwin, in his recent work on "Animals and Plants under Domestication," gives numerous instances of bud variation, where peach-trees produced occasional branches of apricot, and *vice versâ*; also where single fruits of peach, apricot, or plum, were produced amongst others of a different kind; and some examples where the *sport* only extended to *half* a fruit or *half* a flower. These strange anomalies point, without a doubt, to a common parentage of the different kinds, and I think this peach-flower was a case similar to those described by Mr. Darwin.

In May last I found a flower of the small Periwinkle, in which one tooth of the calyx had become a petal. Soon afterwards I received two flowers of Fuchsia which were very interesting. One was tripartite (a common occurrence), but instead of there being three petals, there were only two, the other being stalked, with the limb reduced to the smallest possible size, and *attached to it a rudely-formed anther*. The other flower was



Fig. 62. Peach Flower.

tetramerous, but three of its four petals were, in like manner, partially converted into stamens. The new anthers were evidently formed by the edges of the petals being rolled inwards. In most monstrous flowers, as I have said, complex organs revert to simpler ones, internal organs to external organs, and the fact of flowers being altered leaf-buds is *inferred* rather than *proved* thereby; but in these two very uncommon examples we have more direct evidence, for we find stamens actually being formed from the much more simple petals in the Fuchsia, and coloured petals from the green calyx in the Periwinkle.

During the past autumn, Mr. Britten and I found near Llyn Gwynant, in North Wales, a very remarkable and highly interesting example of Honey-

suckle, which is depicted in fig. 63. In a *normal* state, the flowers are produced in whorls, but the whorls are sessile one upon another, so as to form a sort of flat head or coronet. Each floret is placed within *two* fleshy bracts, which are thickened as the fruit ripens, and become, like the fruit, juicy and of



Fig. 63.

a red colour. The florets have no stalks. A reference to the drawing will show how greatly this curious specimen differed from an ordinary Honeysuckle blossom. The flower-head was lengthened into a rather elegant spray, because the whorls of florets (fig. 64) were separated from each other by intervening portions of stem. The bracts were thinner, larger, and more leaf-like than they usually are, and instead of being in pairs, were in fours, forming what appeared at first sight to be a four-partite calyx. From within these four bracts proceeded generally two florets, on stalks half an inch in length, the florets of a yellowish-green colour, considerably shortened, and very monstrous in form,



Fig. 64.

their internal organs being changed into petals. In one instance (fig. 65), instead of the stamens and pistil being simply converted into petals, there were

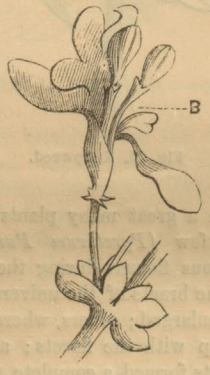


Fig. 65.

two stalks produced from the centre of the flower, each bearing a bud enclosed in bracts like those below the flowers. It is rather remarkable that this flower, so very abnormal in form and colour, had lost very little, if any, of its perfume. We saw several other examples, but none so perfect, or rather imperfect, as this one.

The common Knapweed (*Centaurea nigra*) is very prone to produce small abortive flower-heads in the autumn—perhaps always. When this is the case, the upper leaves of the plant become much more developed. We found several examples during our ramble in Wales; some (fig. 66) in which the flower-heads were reduced to a few small brown scales; but the energy of the plant had ex-

pended itself in forming a bunch of leaves. Others were found which had flowers of the usual size; but there was a decided tendency to form numerous leaves under them. Mr. Britten tells me that *Centaurea scabiosa* also frequently produces small abortive flower-heads at all times of the year.



Fig. 66. Knapweed.

I have seen a great many plants of the double Garden Feverfew (*Pyrethrum Parthenium*) producing monstrous flowers during the last autumn; some, where the bracts of the universal calyx were a good deal enlarged; others, where small leaves were mixed up with the florets; and several in which the bracts formed a complete rosette of pinnatifid leaves under the flower. I think that the past season was favourable to abnormal development in compound flowers, for I observed several daisies in which the same kind of growth had taken place.

Mr. Britten sent me last summer some very curious specimens of Poppy (*Papaver Rhœas*), in which the calyx was persistent, and in which bracts gradually merged into sepals. Some of them had a calyx of three leaves, like that of *P. orientale*, the great scarlet perennial Poppy of old-fashioned gardens. The specimens came to me so much the worse for their long journey by post, that I could not make a satisfactory drawing of them. A poppy, apparently very similar, was described by Mr. Britten in the first volume of SCIENCE-GOSSIP, p. 228. It would be interesting to know whether these specimens and the one he described were gathered in the same place; for if they were, the form has probably been perpetuated from seed. Perhaps Mr. Britten will kindly inform us.

Mr. Charles Bailey described to me a very remarkable white Foxglove that he had lately seen. The upper half of the flower-stem was arrested in its growth, so that the flowers formed a dense head. Each flower was split on the upper side, and was opened out into a flat petal, on the face of which were the four stamens. The flowers were disposed with such regularity that they formed a beautiful rosette, resembling a double Camellia; whilst the structure of this curious monstrosity was almost exactly the same as we see in an ordinary flower of the order Compositæ, and might serve very well to illustrate the way in which a compound flower is formed.

Mr. Grindon showed me, last autumn, some flowers of the wild Guelder Rose (*Viburnum Opulus*) which he had gathered, in which two little green leaves grew from the centre of each of the *barren* florets, like those usually seen in the centre of the flowers of double-blossomed Cherry. In the second volume of SCIENCE-GOSSIP, p. 9, I mentioned that these capillary leaflets in the double-blossomed Cherry often enclosed a second set of petals. This was observed in a very marked degree last spring, when the interior flowers were the rule rather than the exception, and where, in many cases, they opened out completely, and formed new flowers after the petals of the exterior ones were faded and were dropping off.

Mr. Arthur B. Cole has kindly placed at my service some notes and drawings of very remarkable deformities that he has met with in various species of Orchis. These monstrosities are especially interesting as they have a bearing upon, and help to elucidate, the very obscure and paradoxical morphology of that order of plants. The usual structure of an orchis-flower should first be understood by a reference to the following diagram (fig. 67).

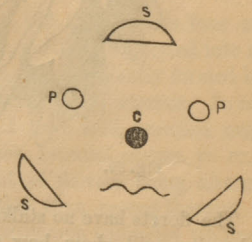


Fig. 67.

There are three sepals, S; two petals, P; and a third petal which differs greatly in appearance in different species, and is called the *labellum*, or lip, L. In the centre is a column, C, consisting of stamens and pistil welded together, as it were, and

supporting a stigma and a two-celled anther. In Cypripedium there are two anthers.

Figures 68, 69, 70, 71, 72, 73, and 74 are plans and drawings of various monstrous forms. The first

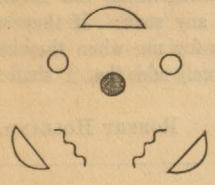


Fig. 68.

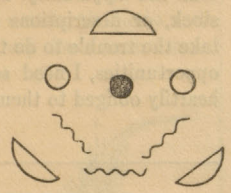


Fig. 69.

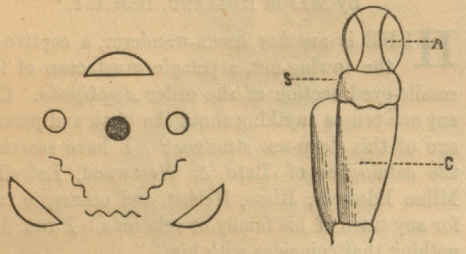


Fig. 70.

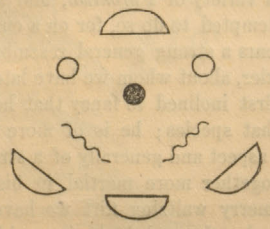


Fig. 71.

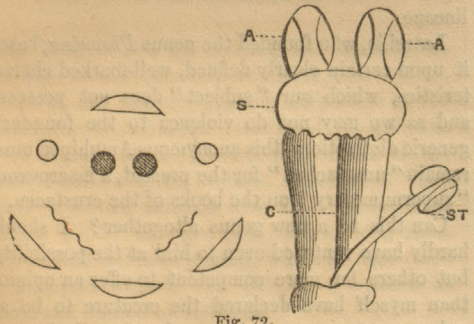


Fig. 72.
Diagrams of *Cephalanthera grandiflora*.

five are from flowers of *Cephalanthera grandiflora*. No. 73 is from *Orchis purpurea*, and No. 74 from *Gymnadenia conopsea*. The same signs are used to represent the different parts as in the diagram illustrating the *normal* condition of the flower. In fig. 68 there are two labellums; in fig. 69 there are three, which are joined together at the base. Fig. 70 has three labellums and a double column. Fig. 71 has four sepals and two labellums. Fig. 72 is a very curious example; it has four sepals, two labellums, and a double column with two perfect anthers; but stranger still, it has, springing from the base of the column, an ordinary filament and two-celled anther containing pollen. In certain species of Orchises there are processes attached to the base of the labellum, which Dr. Robert Brown long ago considered might be the rudiments of suppressed stamens. Dr. Lindley remarked, in reference to this theory, that though extremely probable, it had not yet received confirmation; but that it would be

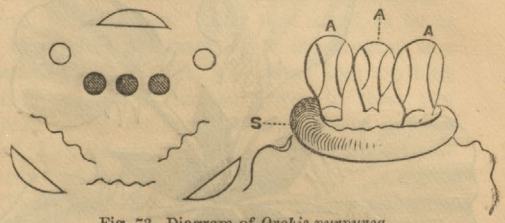


Fig. 73. Diagram of *Orchis purpurea*.

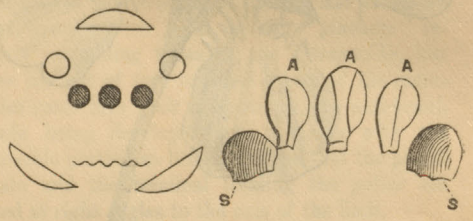


Fig. 74. *Gymnadenia conopsea*.

"conclusively established if the crests of the lip were detected bearing pollen, a circumstance that has not yet been observed." The discovery, therefore, of a free stamen springing from the axis of the column and labellum is of considerable interest. In fig. 73 there are three labellums and three anthers, the two side ones being quite perfect, and the centre one without pollen proper. In fig. 74 the reverse is found; for though there are three anthers, the centre one alone is perfect, the two side ones being only one-celled, and containing no pollen.

I have notes and drawings of several other monstrosities; of primroses with supernumerary petals, or with one flower inside another; of roses extended into leafy branches; and others that are both curious and interesting, but which are similar to some I have before described; and as my paper, too, has grown to a considerable length, I will only select two more examples which are different from the others: these are two specimens of the common garden Nasturtium (*Tropæolum majus*) which I gathered in 1866. One of them differed from the usual form in having two spurs; in the other the spur had completely disappeared, and the flower had become regular in every respect. The calyx consisted of five *equal* lanceolate segments, spreading open, and slightly united at their bases;

the corolla was of five *equal* nearly orbicular petals, alternate with the sepals, and each with a long claw like the three lower petals of an ordinary nasturtium-flower. Stamens eight, which, like the petals, were hypogynous. Pistil unchanged, and having three ovaries. Fig. 75 is a drawing of this very beautiful example of peloria growth. There is no apparent distinction between this



Fig. 75. *Tropæolum majus.*

abnormal form and the genus *Limnanthes* (pretty yellow and white annuals resembling *Nemophila*), except in the number of ovaries; and the inference is that Limnanthes is so very nearly related to Tropæolum, that possibly the sub-order Limnanthaceæ, of the order Tropæolaceæ, is unnecessary. Lindley, in his "Vegetable Kingdom," says that the chief difficulty in placing Limnanthes with Tropæolum is that the former has perigynous, the latter hypogynous stamens. I have, however, carefully examined both, and I must say I can find no difference between them. A double form of nasturtium-flower is sometimes seen, and here also the spur disappears.

The subject of abnormal development in plants is one in which I take so much interest, that I will conclude my paper with a request to my readers, that they will kindly send to me specimens of monstrosities, or of sports, or of any forms of plants that are apparently deviating from the original stock, or descriptions of any such. If they will take the trouble to do this for me when they have opportunities, I need scarcely add that I shall be heartily obliged to them.

ROBERT HOLLAND.

A NAMELESS CRUSTACEAN.

By MAJOR HOLLAND, R.M.L.I.

HERE is another ocean-wanderer, a captive of the towing-net, a pelagic crustacean of the sessile-eyed section of the order *Amphipoda*. Can any one tell us anything about the birth and parentage of this deep-sea stranger? I have searched the catalogues of Bate & Westwood, Latreille, Milne Edwards, Risso, Herbst, and others, in vain for any trace of his family or relations. I can find nothing that coincides with him.

It would save a great deal of trouble to put him down as a variety of *Phronima*, and at first sight one feels tempted to do so, for on a cursory inspection he bears a strong general resemblance to the cradle-carrier, about whom we have lately gossiped; one is at first inclined to fancy that he may be the male of that species; he is of more warlike and masculine aspect and generally of a stronger build, and is altogether more martial in his demeanour than the merry waltzing flirt we have previously dealt with; but beyond doubt it would be a downright blunder to affiliate him to her house and lineage.

Latreille, who founded the genus *Phronima*, based it upon certain clearly defined, well-marked characteristics, which our "subject" does not possess; and as we may not do violence to the founder's generic distinctions, this anonymous Amphipod must remain "unattached" for the present, a macrourous "supernumerary" on the books of the crustacea.

Can this be a new genus altogether? I should hardly have ventured even to hint at the possibility, but others far more competent to offer an opinion than myself have declared the creature to be an unknown stranger, nameless and undescribed.

At p. 75 of the preceding number of SCIENCE-GOSSIP, we have a sketch from life and nature of *Phronima sedentaria*, bearing the nidamental casket containing her young, with as lengthy a description as space would allow, of the construction of those portions of her economy which present the characteristics of the genus of which she may be regarded as the type; it will therefore suffice if in this present instance I confine myself to noticing the particulars in which the nameless one differs from her. The

former does not wear a tub over his head and shoulders, hence we get a better view of him than we got of the nursing mother previously depicted. For the sake of convenience, and to avoid the crowding and confusion which result from the unnecessary repetition of similar details, the limbs and appendages of the right side *only* have been introduced into this illustration.

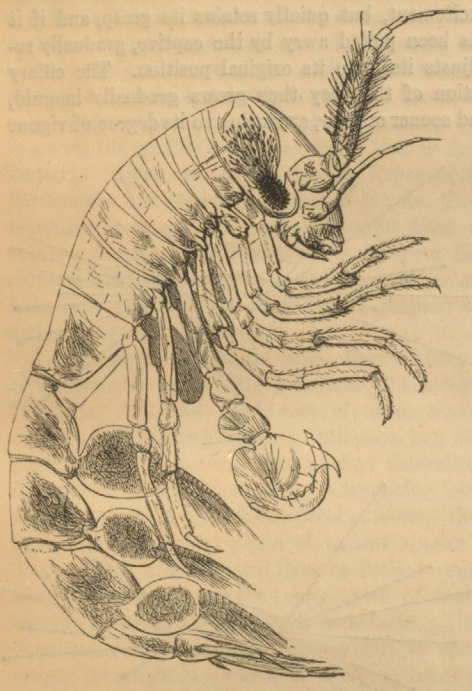


Fig. 76. The Nameless Crustacean, × 5.

The head is shorter, broader, and thicker, the eyes and mouth precisely resemble those of *P. sedentaria*, but the very striking differences in the number, construction, and position of the antennæ are so great that the general appearance of the animal is quite changed by them. Instead of "two minute bi-jointed antennæ with short hairs on the terminal joint," we have two pairs of long stout seven-jointed antennal organs, which at once place our anonyma outside the pale of *Phronima* as defined and limited by Latreille.

The superior antennæ arise immediately above and in front of the lateral eyes; they are remarkably strong and full, the second joint being very largely developed, and thickly set with strong stiff setæ, which give it a brushlike appearance. This second joint is surmounted by a tapering five-jointed filament devoid of hairs or setæ; the entire length of each of these superior antennæ, when fully extended, is equal to one-third of that of the whole body. Below and in front of the lateral eyes arise a pair of seven-jointed tapering non-setaceous antennæ; these inferior antennæ are about three-fourths of the length of the superior pair.

The maxillary limbs, the seven pairs of thoracic legs (excepting the fifth pair), the vesicular branchial sacs of the fourth, fifth, and sixth segments of the thorax, and the three pairs of swimmerets of the three first segments of the abdomen correspond with the analogous parts in the creature previously described; but the third pair of legs are not "usually thrown forwards across the head," nor are the seventh pair "commonly thrown back across the abdomen for the purpose of antagonising the third pair." Our new friend, as far as we know, does not carry his or her progeny in a bassinette, and Nature, who never does anything that is superfluous, has not given to these two pairs of his legs the same special directions given to those of *P. sedentaria* for the specific purposes previously explained.

The fifth pair differ essentially from their analogues in *Phronima:* instead of the stout cheliform claws composed of modifications of the two last joints, we have *fanged* (rather than chelate) "pinchers" remotely resembling those of the *Crangonidæ*, but three instead of two modified joints of the extremities enter into their composition, the antepenultimate being developed into a *manus* with the opposable portion so little produced that the penultimate and the terminal forming the *pollex* are flexed at right angles to the axis of the limb.

We are much in want of information respecting pelagic creatures in general. How few competent naturalists have it in their power to "go down to the sea in ships," and to "do business in great waters." We are apt to speak of "the wonders of the *deep*" when we are really talking about the wonders of *the shallows;* the fact is that of the veritable *deep* we know next to nothing; our marine zoology has been largely dependent upon beach-combing.

Naturalists are not often millionaires. I am not sure that science does not sometimes tend to "clothe a man with rags" if he is an earnest devotee at her shrine. Men with the necessary ability and knowledge have not the means needful for hunting on the high seas; and of the comparatively small number whose profession or business carries them afloat, how very few care to attempt to add their mite to the sum total of human knowledge.

Yachtsmen prefer smooth waters, with a snug anchorage safe under their lee, to the risks and discomforts of the wild mid-ocean; the towing-net, that great revealer of secrets, is almost an impossibility on board a man-of war, or a merchant ship speeding onwards to her far distant station or trading port.

At anything like a high rate of speed, away goes net and all, and at a very moderate pace, the "haul" gets washed through the meshes, or mashed and

macerated into a pulp by the rush of water. Special cruising for the purpose seems to be the only thing that can answer.

How much scientific wealth has been gained by a few hours' deep-sea dredging by Dr. Carpenter in his recent trip in H.M.S. *Lightning!* Perhaps we may venture to hope that those who wield the mighty naval resources of our nation, may one day see fit to afford facilities for searching the surface as well as the bottom of the realm they rule on behalf of Britannia.

Bury Cross, Gosport.

A SUCTORIAL ANIMALCULE.

OF the many curious organisms belonging to the class Infusoria, none are more curious and interesting than the various forms of Acinetæ. They may in general terms be described as amœba-like masses of sarcode enclosed in a structureless, transparent integument, pyriform, ovoid, or spherical in shape, and furnished with rigid and elastic filaments or tentacles, which are retractile, and either acute or knobbed at the extremity; the body being attached by a stalk of variable length to some vegetable or animal substance.

Acineta tuberosa is a commonly occurring form in brackish water. To this species chiefly I shall confine my remarks.

The specimens which came under my observation recently were in the broadest part only $\frac{1}{300}$ of an inch, and when magnified 350 diameters presented the appearance figured below.

The organism is destitute of any mouth or similar orifice, shows no ciliary action at any part, but possesses a pulsating vesicle. The body is filled more or less with bright colourless granules, and assumes various shapes within the transparent integument.

The filaments radiating from the angles are capable of entire contraction, and in this state are quite invisible within the substance of the body; so that they are apparently mere expansions of sarcode, and not distinct organs. They extend frequently to double or treble the diameter of the body, and each filament at its extremity is of a convexo-conical form. They are perfectly rigid, but elastic, ten or eleven in number at each angle of the body, and are spread out in all directions, no two being of the same length.

Attached by its thin dark stalk to a filament of conferva or other substance, Acineta remains quietly and patiently awaiting prey, like a spider in its web, or like an actinia with its tentacles expanded. There is a slight movement occasionally, of the filaments, but for the most part they remain quite motionless. Any small animalcule wandering in their neighbourhood is sporting on dangerous ground, for so sure as it comes into contact with the extremity of one of those delicate, almost invisible filaments, so sure does adhesion take place, and it struggles in vain to escape. If strong and lively, it will pull Acineta on one side and bend the attaching filament in all directions; but Acineta will bring an additional tentacle or two to bear upon its obstreperous victim, and thus render escape impossible. During all this time Acineta exhibits no excitement, but quietly retains its grasp, and if it has been pulled awry by the captive, gradually readjusts itself to its original position. The ciliary action of the prey then grows gradually languid, and sooner or later, according to its degree of vigour

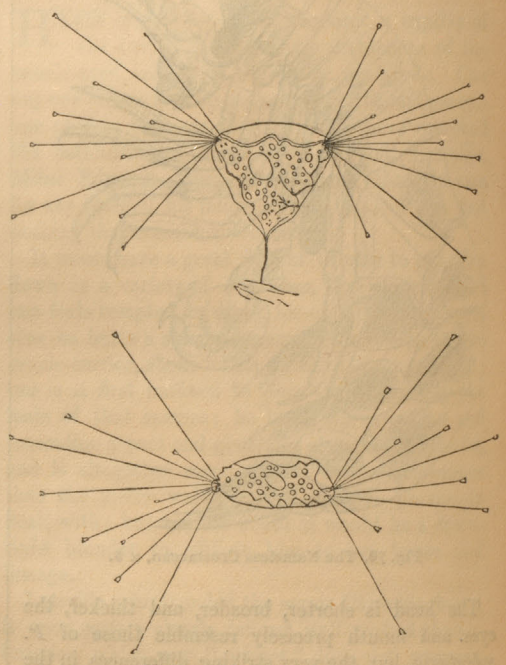


Fig. 77. *Acineta tuberosa.*

and vitality, entirely ceases. No attempt is made by the Acineta to draw the prey towards its body. He simply commences quietly to suck its life-juices by means of the hollow filaments which have effected attachment. This is of course a rather slow process with sucking tubes of such extreme tenuity, but it goes on surely if slowly.

If observed after the lapse of some hours, it will be seen that Acineta has grown plumper, and that its prey has not only diminished in size but become a mere empty sac. When quite done with, attachment is broken, and the rejected carcase is suffered to float away. This process of imbibing the juices of its prey occupies sometimes three or four days when the latter is unusually large. On one occasion I witnessed a Paramecium at least twice the bulk of the Acineta caught in its grasp. In two days the

Acineta had doubled in size and the Paramecium become little better than a shadow.

That the juices of the prey pass into the body of the Acineta, there can be no doubt; but in consequence of the extreme fineness of the filaments in *A. tuberosa*, it is impossible to distinguish any current in them, or the passage of any solid particles. It is doubtful if anything but liquid matter passes through them.

Acineta, though so quiet-a-looking organism, is in reality a voracious animal, and its filaments are always ready to seize prey. When animalcules abound in its neighbourhood, as many as five or six may be seen at one time in its tenacious grasp. It is among the smaller creatures chiefly that it finds its food. Strong and lively Colpodas, Keronias, and Stylonichas are generally too much for it. Their muscular force enables them to escape from its adhesive touch; when they do feel it, however, they evince a remarkably lively sense of their danger, and Acineta is exposed to a good deal of shaking and disturbance on the occasion.

Various forms of Acineta exist: figures of many of which are to be found in Pritchard's "History of Infusoria." Of the life-history of these curious creatures very little is known. Attention has been paid to them by several distinguished naturalists: Ehrenberg, Stein, Cienkowsky, Claparède, Lachmann, and others. Professor Stein considers them to be a developmental phase of various species of Vorticellina; others regard them as distinct organisms, having witnessed the reproduction of similar creatures from germs produced by Acineta. There is undoubtedly a field open here for further microscopic investigation, which is likely to repay the diligent observer. They are certainly found where species of Vorticellina exist, and my own observation leads me to the belief that there is a connection between the two organisms; but only prolonged inquiry, extending over months, can probably settle the point. C. J. M.

Flycatchers' Pellets.—At a recent meeting of the Zoological Society, Mr. A. D. Bartlett, the well-known superintendent of the society's gardens in the Regent's Park, mentioned that under the nest of a pair of Flycatchers built in his house in the gardens, he used to notice little pills upon the ground, being, as he expresses it, "the most beautiful blue pills he ever saw in his life." On examination he found that these little pills were pellets thrown up by the Flycatchers, while the metallic-blue appearance which they presented was caused by the remains of the outside cases of the bodies of blue-bottle flies on which the birds had been feeding.—*Quart. Mag. H. Wycombe N. H. Soc., April*, 1869.

THE PEEWIT, OR LAPWING

(*Vanellus cristatus*).

MOST people have tasted Plovers' eggs, or at least have heard of them. They are now in season, and may be obtained from any of the London poulterers for four shillings the dozen. "Rather dear," you will say, when you can get four times the number of hen's eggs for the same money. True, but Plovers do not lay in farmyards, nor in London mews; and if people will have such delicacies, they must pay a price proportionate to the difficulty of procuring them. After all, they do not always get what they pay for, since, from not knowing a Plover's egg when they see it, they frequently buy eggs of the Redshank, Reeve, Black-tailed Godwit, and even of the Black-headed Gull, instead of the genuine article. But what matter? They are all equally good, and "where ignorance is bliss," we have some authority for saying "'tis folly to be *otherwise*"! It is the fashion to have Plovers' eggs in the season, and when boiled hard with the shells off, who is to say they are *not* Plovers' eggs?

We have often been amused with the observations of our young lady friends who sometimes pay a visit to our museum. On going to the egg cabinet with a laudable desire to know something of oology, one of the first remarks is "Have you got any Plovers' eggs?" and on being shown a drawer full of Golden Plover, Lapwing, Dotterel, &c., they are fairly puzzled to say which are the eggs they had at supper the other night. This difficulty overcome, the next question is "Which is the Plover that lays these eggs?" We have only to point to the pretty graceful Peewit, to elicit a chorus of praise in its favour. The long crest-feathers, glossy green back, black breast, and white underparts, relieved by the chestnut tail-coverts, combined with a certain pertness of expression, render it a very attractive bird.

What pleasant associations are recalled as we gaze at it! The rough meadow where we first found the eggs, as a boy, and watched with delight the wonderful evolutions of the parent birds, as with plaintive cry they wheeled and tumbled in the air before us. The oozy mud-flats, with the intersecting creeks, down which we urged our punt in May and August after Curlew, Godwit, and Grey Plover (the mud there was sometimes black with Peewits). The brown and purple moor-side, where we found the Peewit in the midst of Grouse, Curlew, Golden Plover, and other north-country friends. The quaking bog, where in winter we have shot now a Peewit, now a Snipe, and the next minute missed a Jack. The old pollard in the water meadow, where we used to wait at night for ducks, and on blank nights make up for a disappointment by bagging Peewits. Such are the scenes which it

is one of the chief pleasures of the naturalist to recall when looking at a bird in his collection.

The Peewit may be considered a resident species, for it may be found in some part or other of the country all the year round. There is no doubt that great numbers move southwards at the approach of winter; and the birds which we notice in the southern counties in the fall of the year, are probably visitors from more northern localities.

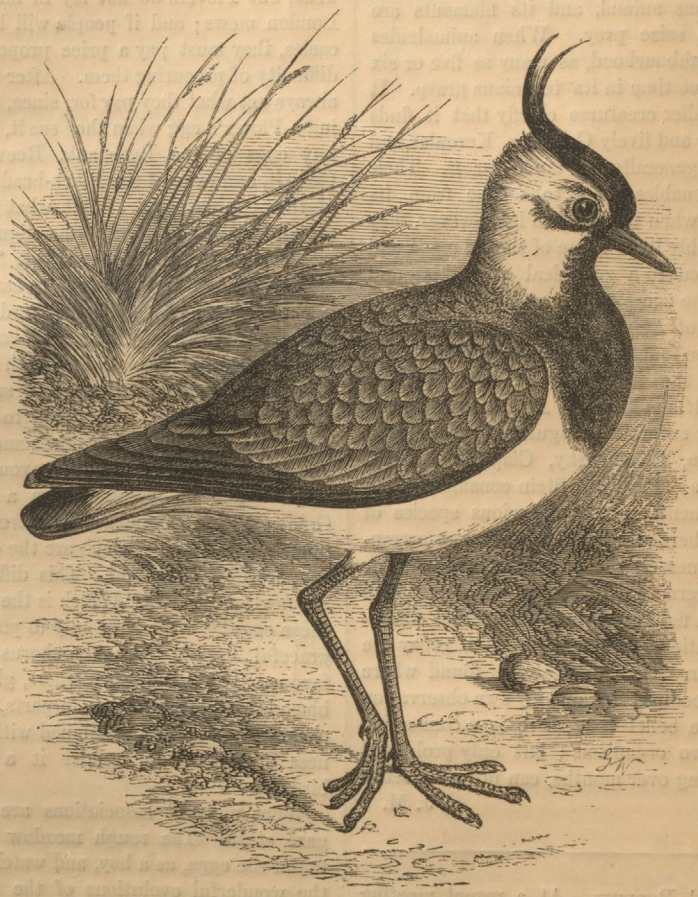


Fig. 78. The Lapwing.

In many parts of the country we have remarked that the same ground is annually resorted to by Peewits for the purpose of nesting; and hence we may conclude that the same birds return year by year, impelled by curious instinct, to the very spot where they have formerly reared their young. They pair towards the end of March, and early in April collect straws and dry grass, and form a slight nest in a depression of the ground. When the full complement of eggs is laid, each nest contains four, and the harvest time for poulterers and game-dealers commences about the middle of April. When the locality which the birds have selected has been discovered, dozens of eggs may be picked up on a few acres, for Peewits are gregarious in their habits, and the nests are frequently only a few yards apart. The eggs, which are considerably pointed at the smaller end, seldom vary much in colour, being olive-brown, spotted and splashed towards the larger end with black or dark umber. We have once or twice taken eggs of this species which were of a pale stone-colour, with small black spots at the larger end. These strikingly resemble very large eggs of the Ringed Plover (*Charadrius hiaticula*), and afford an illustration of the fact that some birds, while usually laying eggs peculiar in colour to their own species, occasionally lay eggs which resemble those of other species in the same family. We have noticed this in many cases.

The young Peewits are very active as soon as they are hatched, and as they leave the nest at the approach of an enemy and cower down close to the ground, the mottled brown colour of their backs

renders it very difficult to catch sight of them in this position. In this way no doubt they often escape destruction.

The food of the Peewit is, to a great extent, insectivorous. The stomachs of a great many of these birds, which we have shot and examined on grass-land upon a clay soil, were filled with different species of small *Coleoptera*, and minute particles of grit, while others, which we procured on down-land upon a chalk soil, contained fragments of two *Mollusca* which are extremely common in such situations,—*Helix virgata* and *Helix caperata*. It is the *Helix caperata*, by the way, which, being taken up with grass by sheep, is said to impart the excellent flavour to the South-down mutton. Judging by the condition of the Peewits which had fed upon this mollusk, we should say that its properties are very fattening.

When the birds get down to the shore, they lose their flavour, and are then not nearly so good for the table. We have noticed this in the case of the Curlew, Golden Plover, Grey Plover, Redshank, and many others besides the Lapwing. The reason of this, no doubt, is the change in their diet. On the shore they get sand-hoppers, shrimps, and other small *Crustacea*, which impart more or less a marine and disagreeable flavour.

As the name "Peewit" has been given to the bird from its peculiar note, so has the name "Lapwing" reference to its characteristic flight.

Those who live in the country must have noticed how appropriately both these names have been applied. In some places the bird is known as the "Green Plover" in spring, and the "Black Plover" in winter. At the approach of the nesting season the back and scapulars become of a dark but bright metallic-green colour. In the winter this colour becomes darker and duller, until at a little distance it looks almost black.

We know few sights more engaging than a flock of Peewits on their breeding-ground, where the eye is pleased with their graceful actions and curious evolutions on the wing, while the ear is charmed with their strange long-drawn notes. Happy the man who lives near the resort of these birds, and who, listening to "nature's sweet sounds," can hear amid the well-known caw of the Rook and the gentle murmuring of the Wood-pigeon, the plaintive cry of "Pee-wit." J. Edmund Harting.

Large Egg.—There was brought me on Saturday (March 20th) a hen's egg of so large a size that probably the dimensions may be worth notice:—Circumference round the two ends 9 inches; round middle, 6⅞ inches; length, 3⅝ inches. Inside were two yolks, one of which, enclosed in a very thick and strong membrane, was the size of a moderately small egg. Both ends were very rounded, one a little less than the other.—*Henry Ward.*

NOTES ON NEW YORK DIATOMS.

By F. Kitton.

Communicated to the Quekett Microscopical Club.

Before alluding particularly to the two bottles of Diatomaceous material forwarded by Dr. Edwards, it will be necessary for me to quote from the letter which accompanied the bottles, as much as refers to this subject. He writes: "I have put up two bottles; one is of the sediment from the water supplied to this city (New York), and contains *Amphiprora ornata*, and other things, as *Asterionella*. I want to call your attention to, and get your opinion of, one or two things therein. Burn it on a cover, and you will see—*First*, two species of *Orthosira*. Now Bailey found in this sediment ('Croton water,' so called, coming in an aqueduct from the Croton river) a *Gallionella*, which he called *G. Crotonensis;* but his form was undoubtedly the smallest of the two, and is, I presume you will

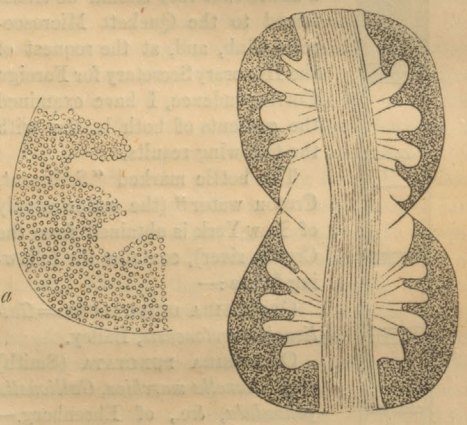


Fig. 79. *Amphiprora ornata*, × 600.
a, portion of keel, × 1,000.

agree with me, *Orthosira orichalcea;* but the other form, coarsely marked, and with spines at the ends, is new to me. If it has not been described, would it not be well to transpose the name 'Crotonensis' to this? For my part, I am not in favour of naming forms after places or persons, but strongly incline to distinctive and descriptive names. Give me your ideas hereon. *Second*, Is the *Asterionella* here present the same as any of those described? I think not. *Third*, What is the queer form looking like a *Fragillaria*, except that the frustules only touch at the middle, and is hence like a lot of *Synedra* laid side by side? I have never seen it in any other gathering but this. If this gathering is boiled in acid, of course you do not get these forms in their best condition; and burning on the cover, after spreading out, I find give very good results, especially if it is then examined dry.

"In the second bottle I send you a gathering I

made last November near this city, a locality I chanced to pass, having to go that way to visit a factory. I shall visit it again this spring, as the first haul was so satisfactory. Examine it in fluid, and you will see *Gomphonema constrictum* and *G. capitatum* growing on the same stalk. I always suspected these were but one species, and here we have proof of it. I tried to keep this gathering alive and rear the *Gomphonema;* but, though the Conferva is still in a healthy condition, the Diatoms all dropped off. Perhaps this was their normal mode of passing the winter; and I may yet have them again. I shall watch it with interest, as I am anxious to discover, if I can, how some forms pass the winter."

This letter was addressed with the bottles to my late friend and correspondent Professor G. Walker-Arnott, of Glasgow University. The lamented death of this gentleman before the communication reached him, resulted in Dr. Edwards expressing a desire that they should be transferred to the Quekett Microscopical Club, and, at the request of the Honorary Secretary for Foreign Correspondence, I have examined the contents of both bottles with the following results.

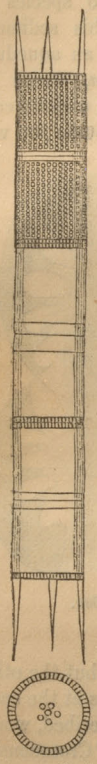


Fig. 80. *Orthosira punctata*, × 400.

The bottle marked "Sediment, Croton water" (the water supply of New York is obtained from the Croton river), contains the following forms:—

Orthosira orichalcea = *Gallionella crotonensis*, Bailey.

Orthosira punctata (Smith) = *Gallionella marchica, Gallionella granulata*, &c., of Ehrenberg.—I refer the form in this material without hesitation to the species described and figured in the "Synopsis," having had the opportunity of comparing it with specimens prepared from a portion of the gathering in which Professor Smith found the form he describes and figures. The spines, so conspicuous in the Croton water specimens, may also be detected in the British species, although not figured in the "Synopsis" (probably overlooked in the balsamed slides). I cannot determine satisfactorily the presence of the spines on every frustule, but faint traces of them may be seen in the frustules adjoining those bearing spines (fig. 80).

Amphiprora ornata, Bailey.—This very common and distinct species is not unfrequent in this gathering; and as it has recently been found in Great Britain, I give a specific description.

Frustule constricted, ends broadly rounded; connecting zone marked with a series of irregular lines (? annule); valve narrow, linear, elliptical; keel conspicuous, twisted, with a broad marginal band, dentate on the inner margin, and delicately punctate (fig. 79).—Croton water, New York, Dr. Edwards; Lough Gartan, Dr. W. Arnott and F. Kitton.

Cyclotella rotula, fine, and the spines conspicuous.

Cyclotella minutula. Kutz.

Cyclotella kutzingiana. Thw.

Asterionella gracillima, Hantzsch. — This form is probably only a variety of *Asterionella formosa*. It is of much more frequent occurrence than the latter. The stellate arrangement of the frustules has been destroyed in this gathering by too long maceration in the water; but the frustules are precisely like those found living in this country. It is of frequent occurrence in the water supplied to Norwich, and also in gatherings from Ormesby Broad (Norfolk).

The form Dr. Edwards supposes to be a *Fragillaria*, I have some hesitation in referring to that genus. If we adopt the usual mode of taking generic characters from the valve, it is impossible to distinguish it from *Synedra;* if from its mode of growth, it shows greater affinities to *Fragillaria*. I therefore place it in *Fragillaria*, and append a short specific character.

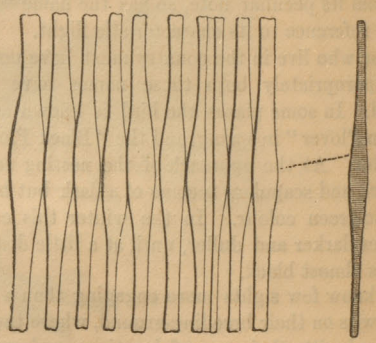


Fig. 81. *Fragillaria Crotonensis.*

Fragillaria Crotonensis, n. s., F. Kitton.—Frustules linear, inflated at the central part, where they cohere and form a ribbon-like filament; valve narrow, acicular; striæ faint, moniliform (fig. 81).—Croton water, New York, Dr. Edwards.

The contents of bottle No. 2 exhibit, as Dr. Edwards states, *Gomphonema capitatum* and *Gomphonema constrictum*, both growing on the same stipes.

Norwich.

Microscopical Seeds.—Correspondents making inquiries for small seeds in common cultivation may obtain a great variety, on moderate terms, from a practical microscopist, Mr. W. Thompson, Seedsman, Tavern Street, Ipswich.

THE CUCKOO-SPIT.

A TALL Begonia, standing against the glass, was lighted up with great beauty by the sunshine of last September, when a little sparkling drop was every now and then observed to fall across the semi-transparent leaves and stem. On examination it was found to proceed from a congregation of cuckoo-spits formed under one of the upper leaves. Here, then, was this insect in its perfect state, feeding on the sap, just as the larva had done; only throwing off the superfluous moisture in tiny drops, instead of blowing bubbles. The inference drawn on this subject in a former paper

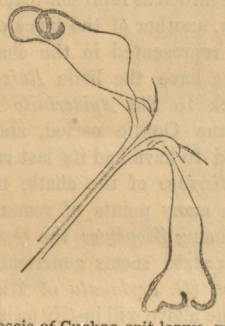


Fig. 82. Proboscis of Cuckoo-spit larvæ, with second set of instruments, and their muscular appendages.

is therefore confirmed (*vide* Science-Gossip, July, 1868). De Geer, I have since learned, has made the same observation. It may be interesting to make a few remarks on the proboscis which does

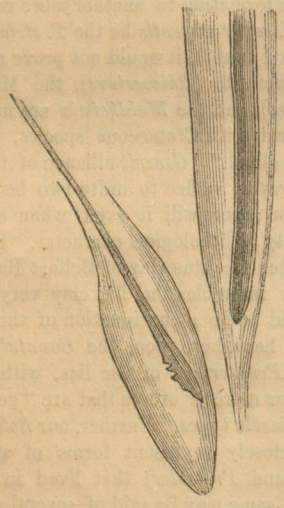


Fig. 83. Part of the second set on one side, highly magnified (× 200).

this little creature such good service, and especially on the provision made, in some few cases, for its renewal or repair. The form of the proboscis is a frequent one. Two half cylinders, with foliated edges and sharpened points, fit into each other so closely as to form an air-tight tube, through which the sap is drawn by the powerful suction pump above. It is accompanied by two serrated lancets, one on either side, which widen the puncture made by the tube, prevent its pinching, and admit the pressure of the air. Whether the parts of the tube in a proboscis of this character slide upon each other when in action to increase the power of penetration, has been much discussed, and, on very high authority, it has been contended that they do not; but it may be submitted that, in this instance, the parts of the tube are furnished with the same muscular appendages as the lancets, which are necessarily motile. In examining numerous specimens of the larva, it was observed that a few, perhaps one in ten, differ from the rest, in having a muscular coil on each side of the head. A high magnifying power brought out the true character of this. These favoured few were provided with a double set of cutting instruments, as are some of the higher mammals with a second set of teeth. The points of these additional parts rest just above the terminations of the muscles of the first set each to each, and so are ready to advance and slide into place when required. Why only a few should be so provided, it is not for us to ask. This insect, from the moment of being hatched in spring until it deposits its eggs at the close of the year, depends on its proboscis for a supply of food —a long time for so delicate an instrument to last unimpaired, especially in seasons of drought like the last, which thrive and harden the leaves and stems of plants. Nature, therefore, so to speak, in kind solicitude for the preservation of this little link in the chain of animated beings, has given to a select few a second chance; a reserve for occasions of difficulty and danger, as in the instance of the small eggar moth, adduced by Professor Westwood (in the "Entomologist's Text Book," p. 211), some few of which, by another method, are preserved through inclement seasons, that the species might not become extinct. Such is the explanation offered of this remarkable fact, which, as it is only occasional, may have hitherto escaped observation. S. S.

GEOLOGY.

Entomostraca in Shale.—In a recent number I see a notice of a new Entomostraca found in the roof of the coal-seam at Cramlington by Mr. Thomas Atthey. In some coal shale I have got from Bradford, near Manchester, I find these Entomostraca in great abundance. A small portion of this shale, viewed under a low power as an opaque object, shows what was once the horny case of these creatures in almost their original form. If a section of this shale is ground very thin and mounted for the microscope, the cases of the Entomostraca are shown almost as transparent as glass. The same shale in

which these Entomostraca occur at Bradford is also very full of fish remains, for the most part in a very fragmentary state; and the fact of fish remains being found in this state generally is held by several geologists to be caused by the presence of these Entomostraca. In the shale above a small seam of coal in this locality, locally known as the Little Mine, but better known to geologists as the Lower Foot Coal-mine in the Ganister series, are found fish remains identical with some of those found in Northumberland. I have cut transparent sections of Coprolites from this Lower Foot coal, and they show long and cross sections of *Ganacrodus hastula* (Owen), showing the beautiful point, which seems to be the only part tipped with enamel. Cross sections of teeth that are scarcely visible to the naked eye are also shown in these Coprolites. The dentine of the tooth, with the pulp cavity in the centre is shown as distinct as if the section was from one of the large *Sauroid*-fishes (of course it requires the higher power of the microscope to see this). In the same Coprolite are also shown sections of scales cut in various directions, as well as fragments of bones, &c. Another Coprolite I have found in the shale above this little coal-seam shows in a transparent section almost an entire mass of very small scales, cut in almost every direction: they show the markings on the scales most splendidly.—*John Butterworth.*

WHAT IS A GEOLOGICAL FORMATION?—At one time I could have given a tolerably definite answer to the above question, but if we are to accept the views suggested to Dr. Carpenter and Dr. Wyville Thomson, by the results of their late deep-sea dredging, it will not be easy to say what constitutes a geological formation. I considered that I understood the matter when I believed that such a formation was a bed, or series of beds, that had a definite stratigraphical relation to other series of rocks, and was when fossiliferous marked by a distinctive fauna or flora of its own. We further fancied that such formations were not originated contemporaneously, but succeeded each other in time, from the "Laurentian" of an epoch vastly remote, to the "Eskers," "raised beaches," and "valley gravels," of "Postpliocene" date. Drs. Carpenter and Thomson put forth a theory that surprises me as much by its slender foundation as by its novelty. They say (speaking of the calcareous mud that they found on the floor of the North Atlantic, off the Faroe Islands), "This mud being not merely *a* chalk formation, but *the* chalk formation, so that *we may be said to be still living in the Cretaceous epoch.*" (*Vide* Report on Dredging in last number of Proceedings of Royal Society.) On reading the above, I looked with some eagerness for the grounds on which such a startling announcement was made, and I must confess that they are not to my mind at all convincing. Some stress is evi dently laid on the physical character of this sea-bottom: it is a viscid mud, that, like our Cretaceous rocks, is mainly composed of calcareous exuviæ of marine organisms. Then there is an abundance of siliceous sponges, but it is not shown that any of these are identical with Cretaceous sponges. What appears to be the strongest part of the case I will give in the words of Dr. Carpenter. He says:—"Thus among molluscs we have two *Terebratulidæ*, of which one at least, *Terebratula caputserpentis*, may be certainly identified with a Cretaceous species, whilst the second, *Waldheimia cranium*, may be fairly regarded as representing, if not lineally descended from, another of the types of that family so abundantly represented in the chalk. Among *Echinoderms* we have the little *Rhizocrinus*, that carries us back to the *Apiocrinite* tribe, which flourished in the Oolitic period, and was, until lately, supposed to have had its last representative in the *Bourgetticrinus* of the chalk, to which the *Rhizocrinus* has many points of remarkable correspondence. Among *Zoophytes*. the *Oculina* we met with in a living state seems generically allied to a cretaceous type (*O. explanata* of Michelin)." If evidence like the above will justify us in considering that the Cretaceous epoch is still unexpired, what formation can we truly say is complete? But the argument is not sufficiently convincing to cause us to make such a huge "rectification" of our ancient boundaries. Geologists know well that there are no entire life-breaks, some species live on and pass up from one formation to another more recent; so that if the *T. caput-serpentis* be the *T. striata* of the chalk (which I doubt), it would not prove anything. The Pear Encrinite (*Rhizocrinus*), the Madrepore coral (*Oculina*), and the *Waldheimia* are not specifically identical with Cretaceous species, but only "generically allied." *Generic* alliance of the fauna will not, however, suffice to unite two beds in the one formation; nor will it even when combined with similarity of lithological character. If it were otherwise, then the blue clay of Belfast Bay, which lithologically resembles the lias clay very closely, might be said to be a continuation of the Liassic series. We have here, too, the *Comatula*, representing the *Pentacrinus* of the lias, with oysters, and a score or more of others that are "generically allied" to Liassic types. Further, our *Solaster* and *Ophiocoma* closely represent forms of star-fishes (*Lepidaster* and *Protaster*) that lived in Silurian times. The same may be said of several genera of living *Mollusca*, so that if we accept the statement I have been commenting on, some other *savans* may show that we are actually living in Silurian times. Geology would have to be freed from all our previous ideas regarding the sequence of strata, and we would have to answer anew the question, What is a geological formation?—*S. A. Stewart, Belfast.*

ZOOLOGY.

Artemia salina in America.—In a paper entitled "Animal from Salt Lake," in your last number, I see that your correspondent S. A. Biggs states he knows of no authority who has noticed the presence of *Artemia salina* in American waters. I beg, however, to refer him to a paper of my father's published in the *Philosophical Magazine*, November and December, 1868, * in which he notices the presence of large numbers of crustaceans, which he believed to be *A. salina*, in Owen's Lake, California. The waters of this lake at the time of his visit, January, 1866, had a specific gravity of 1·076, and on analysis afforded the following results in an imperial gallon:—

Chloride of sodium	2,942·05	grains.
Sulphuric acid	589·12	,,
Carbonic ,,	1,206·80	,,
Silicic ,,	55·34	,,
Phosphoric ,,	15·43	,,
Potash	175·49	,,
Soda	2,127·07	,,
Organic matter	16·94	,,
	7,128·24	

This water was so strongly alkaline that specimens of the crustaceans preserved in a bottle of it entirely disappeared a short time after death; thus showing that, as soon as vitality had ceased, a chemical action set in, by which their bodies were rapidly dissolved.—*A. G. Phillips, Cressington Park, Aigburth, Liverpool.*

Early Birds.—Though not much of an ornithologist myself, I know that the dates of arrival on our coasts of migratory birds are interesting to such as are. I live close to the sea-beach at Worthing, the road and narrow Esplanade only dividing my house therefrom, and on getting up this morning (April 7) and taking my customary "look out" at the weather, I saw flitting about on the beach and Esplanade many birds which turned out to be wheat-ears in beautiful plumage. They had evidently only just or *very* lately arrived, many of them being *heavy* in their flight, and apparently *dazed;* otherwise they would not have been seen on a public esplanade, and even in the road just close to the houses.

April 8th.—I saw two swallows coursing along the shore to-day.—*W. Hambrough, Worthing.*

Rat Dying of Fright.—A rat had done considerable damage for weeks, and could not be caught—he was too cunning for that. It had a hole, into which it ran the moment the door was opened at the other side of the office, and on one occasion my brother-in-law happened to get in comparatively unobserved by the gentleman. He clapped his foot over the hole: the rat made a dash at his foot; found the exit closed; reared on his hind legs; uttered a piercing shriek—fell back, and died.—*G. H. B.*

The Bittern.—The Rev. Rd. Lubbock, in his "Fauna of Norfolk," published in 1845, says, "I believe that a few pairs [of Bitterns] still regularly breed around our larger broads." That it has done so of late years is very doubtful, but from its retiring habits an occasional nest *may* have escaped notice. However, on the 28th of March, 1868, two eggs were actually taken from a nest at Upton, and on the 25th May of the same year a young bird was taken alive in the same locality. This came into the possession of a Mr. Bell, of Norwich, who has been good enough to allow me to see it several times, and upon inquiring a few days since, I was informed it was still alive and well. Although the Bittern is not included in the list of birds to which the "Sea-bird Protection" Act will extend, still I hope this much-needed enactment will, by discouraging the use of the gun during the breeding season, to some extent afford its shelter to many others than those enumerated in its preamble. There is ample shelter for the Bittern; all that is required is that it should be allowed to remain unmolested. How readily birds will return to an old breeding-place, should circumstances permit, even after it has been rendered unsuitable for their purposes for many years, is remarkably shown in the case of the return of the Black Terns to their old quarters after the inundation of the winter of 1852–3, when four pairs remained to breed in Southny Fen. One pair, I regret to say, was shot, and the eggs of the other three pairs were taken.—*T. Southwell, Norwich.*

Helix nemoralis.—This species is abundant on the sand-hills, Deal; but although I have examined a large number, I never saw the violet-brown variety there, the latter being common enough in the adjoining hedges; in fact, about ninety per cent. are yellow, the rest being pink, and the prevailing variety is the single-banded yellow one; the five-banded yellow sort, the type of the species, being uncommon. The specimens from the sand-hills are also notably larger than those from the neighbouring hedges. I have two specimens, one from the sand-hills, about $\frac{1}{16}$ of an inch in diameter; and the other from a hedge, $\frac{9}{16}$ in diameter; but, of course, this is an extreme case: they seem to thrive well close to high-water mark, but lose a good deal of their colours in such situations.—*H. C. Leslie, 3, Sandown, Deal.*

* "Notes on the Chemical Geology of California," by J. Arthur Phillips.

BOTANY.

COCHLEARIA.—Both the *Cochlearia Danica* and the *Cochlearia Anglica* are said to be merely varieties of the *C. officinalis;* and while writing this I must add that "F. W.," as well as your other correspondent, rather mistook my meaning with respect to the term annual; though I admit the vague way in which I unfortunately worded my notice quite accounted for their reading of it. I intended to say that the Scurvy-grass under cultivation will arrive at maturity within *a* year. Strictly speaking, I suppose an annual is a plant that flowers and fruits, when raised from seed, in the same year in which the seed is sown, and according to the experiments that I have seen tried with the *C. officinalis*. I only meant to say that if its seeds are sown early in the summer, the leaves will be ready for use, and the plant itself will have fulfilled its mission, and, I think, the root will have perished, before the twelve months have run their course.—*Helen E. Watney.*

THE SCURVY-GRASS.—Thanks are tendered for notices and opinions on the habit of this plant. They are as various as those found in books. The information from the coast of Antrim may be taken as conclusive. It may be useful to clear up the meaning of the words "annual" and "biennial." An annual plant makes its growth, perfects its seed, and dies in one season—*annus*, a period between two winters. A biennial makes its growth in two seasons; forming leaf and root the first, and running to seed in the second, when it is exhausted, and dies. (*Vid.* Keith's "Botanical Lexicon.") It is easy to see to which of these the Scurvy-grass corresponds: germinating at midsummer and dying, after perfecting seed, at the same time in the following year, as it does in gardens and other sheltered places. It is true, as "H. W." suggests, it might take an annual habit if sown in spring; but this would not be, as he justly observes, its natural state; indeed the plant seems to resent such treatment, for Miller says it does not grow readily from a spring sowing. On the bleak shore and mountain-side, however, the *Cochlearia officinalis*, it can be no longer doubted, takes a perennial habit; that it does so is now, as appears, admitted in the last edition of Hooker's "British Flora," but that it is at the same time an annual is, in the cautious language of the Scotch law courts, "not proven." The habitat at Weston, mentioned in my first notice, is on a bank by the roadside, just opposite the new pier.—*S. S.*

DOG VIOLETS.—Will any one send me *fresh* specimens of *Viola canina*, L., as distinguished from either of the forms of *V. sylvatica?* I will gladly send in return either of these forms. Their time of flowering is remarkably different: *V. Reichenbachiana* has now (April 5) been well in flower for a month; of *V. Riviniana*, only two blossoms have been noticed either by myself or by other local observers.—*James Britten, High Wycombe.*

CLAYTONIA PERFOLIATA.—As some notices of the places in which this plant has become naturalized in England have appeared in former numbers of SCIENCE-GOSSIP, it may not be uninteresting to some of your readers to learn that it grows profusely in one spot at Stowmarket, Suffolk. The locality is a sheltered bank in one of the hop-grounds near the town, which is in many places literally covered with it. The first perfoliate leaves, with the flower-buds in the centre, are now (April 6) beginning to appear.—*F. T.*

PLANTAIN HAIR.—In June, 1867, my attention was first drawn to the presence of a hair (or something like a hair) which is lodged in the base of the leaves of *Plantago media*. It occurred in half the plants I took up (this was at Hollesly, in Suffolk). I afterwards found it at Beccles, and last summer abundant here. The plant must be dug up by the roots and the outside leaves carefully pulled off, and at the third or fourth leaf the hair will be found. It varies in length from one to three inches, and its colour all shades of brown, from nearly white to nearly black; it looks like a human hair, but differs in being pointed at both extremities. There is only one hair in each plant, and it is in those growing chiefly on moist meadows and river-banks that it is most abundant. I have not found it in either *Plantago major* or *lanceolata*. Will some of your correspondents tell me what this is? The fact of this hair being always present in summer has given rise to a superstitious custom of East Suffolk maidens, who, after turning three times with their heel on the plant, think the hair found within will be the same colour as their future husband's. I suppose it has some connection with an insect that feeds on the plant, and I shall be very much obliged for any information.—*Burton B. Harvey, Sculthorpe, Fakenham, Norfolk.*

LAUREL BERRIES.—Your correspondent Helen Watney may be interested to know that, living on the Surrey Hills, where laurels grow very well, we have for many years used the large grape-like bunches of black fruit of *Cerasus Lauro-Cerasus*, both fresh-gathered and preserved in bottles, for mixing with black currants in tarts, &c., which they improve immensely. Also preserving them in brandy, as brandy-cherries, when, after keeping a couple of years, the brandy becomes most deliciously flavoured by the prussic acid of the kernel, and quite harmless. This, as well as the young leaves, we used for flavouring puddings, creams, jellies, &c.—*M. C.*

MICROSCOPY.

Live-box.—In March, 1867, I had the pleasure of bringing to your notice a modification of a live-box (see March, 1867, p. 66). Having further simplified and improved it by cementing the under thin glass cover, and closing the upper by a single screw and simple spring, I am desirous of communicating same through your valuable pages to my fellow microscopists, to whom (as it can be made by any one, and at a cost of a few pence) it may be of use.

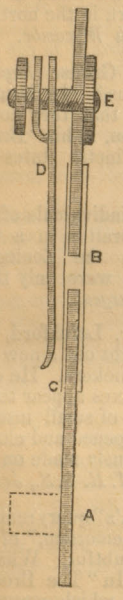


Fig. 84.

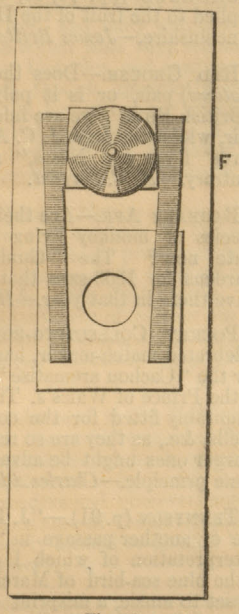


Fig. 85.

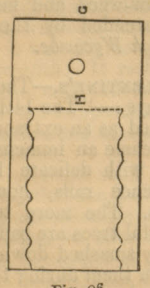


Fig. 86.

A. Glass slide with two drilled holes; B. Thin glass cemented to glass slide; C. Thin glass cover, loose; D. Spring cut out of thin sheet brass; E. Brass binding-screw; F. Front view of slide, showing position of spring; G. Spring cut from thin brass at waved lines, and turned back at dotted line, H., and cut level with G.

If desired to enable the instrument to be turned over, the binding-screw may be shortened, and a piece of glass cemented on where indicated by faint dotted lines.—*J. W. Meacher*, 10, *Hillmarten Road.*

A Cheap Magnetic Stage.—Get a smith to forge a piece of steel a quarter of an inch thick, the shape of the drawing; and on the under part of this screw three pins, which are to be let into corresponding holes in the stage of the microscope. If a strong magnet is rubbed half-a dozen times in one direction over this piece of steel, it will become a permanent magnet. The carrier (or keeper) as in Mr. Ladd's microscopes is a bar of soft iron, ¼ of an inch broad, and ⅛ of an inch thick, and 3½ inches long. This stage possesses the following

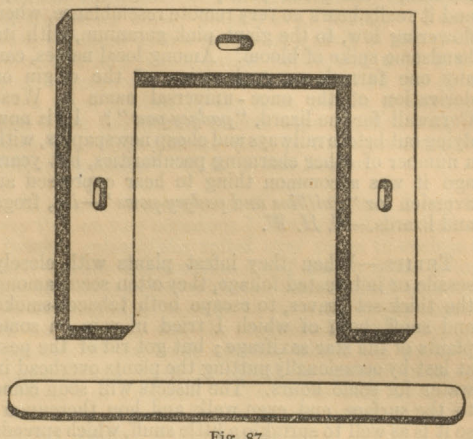


Fig. 87.

advantages: it is exceedingly cheap, the movements universal, it can be fitted to almost any stage, and can easily be removed when not in use.—*J. H., Cheltenham.*

Hemiptera for the Microscope.—Now that a minute Hemipterous insect from Ceylon (*Tingis*) is introduced as an interesting microscopic object (which it certainly appears to be), it may be worth while to call attention to some allied species which occur in this country—the genera *Campylostira* and *Orthostira*, in both which, though the array of spines is wanting, yet the thorax and elytra are coarsely reticulated, and over-lap the margin of the body in a manner similar to *Tingis*. One species is not uncommon in moss in the south of England, and in former years in searching for minute coleoptera I used frequently to meet with it. The species are described and the genera illustrated in Messrs. Douglas and Scott's "British Hemiptera-Heteroptera."—*George Guyon, Ventnor, Isle of Wight.*

Snails' Eggs.—I have not yet seen any notice of the spawn of water-snails as an interesting microscopic object, but any one who has access to a fresh-water aquarium will find it not unworthy his attention, as no matter at what stage in development it is examined, the young snail in each egg can be seen in active motion.—*Edwin Holmes.*

Balsam Substitute.—I have lately used the clearing liquid sold for rendering "Diaphanie" transparent, as a mounting medium instead of balsam, and find it easier to manipulate, free from bubbles, and to dry quicker.—*Edwin Holmes.*

NOTES AND QUERIES.

WHAT'S IN A NAME?—Your correspondent of last month will, I think, allow that I can furnish her with a better name for the *Hydrangea* than that of "Jenkins," who evidently had not taken his degree, even in that ungoverned language, gardeners' Latin. Cottagers in the Midland Counties have repeatedly pointed out to me the pink variety in their little gardens, with great pride, as "high-geraniums," and it really bears no very remote resemblance, when flowering low, to the giant pink geranium, with its handsome spike of bloom. Among local names, can any one furnish an explanation of the origin or derivation of the once-universal name in West Cornwall for the lizard, "*padgey-pow*"? It is now dying out before railways and cheap newspapers, with a number of other charming peculiarities, but years ago it was a common thing to hear expressed an aversion for "*quilkins and padgey-pows*"—*i.e.*, frogs and lizards.—*E. H. W.*

THRIPS.—When they infest plants with closely sessile or imbricated foliage, they often seem, among the thick-set leaves, to escape both tobacco-smoke and snuff, both of which I tried in vain on some plants of the star saxifrage; but got rid of the pest at last by occasionally putting the plants overhead in water for some hours. The insects will soon come to the surface, and even walk and hop thereupon: so it is as well to sprinkle a little snuff, which spreads into a film which soon kills the thrips. This method prevents their taking refuge in the soil, as I believe they do from tobacco-smoke, and may be used with plants to which the wet sponge (I have often used a wet brush) could not be applied so conveniently. Why barbarize the word into *thrip*, any more than clip off the *s* of cynips, &c.?—*H. B. Biden.*

LOCAL NAME OF BUTTERFLY.—Comparatively few of our butterflies have been so far distinguished one from another by the vulgar eye as to have any name applied to them. I find, however, that the Peacock (*Vanessa Io*) is in some parts of Devonshire called the "Prince George." It would be curious to ascertain the origin of this. Could it be carried back to the days of Queen Ann, when there was a Prince George somewhat notorious? The Georges of more recent date belonging to the royal house have been, with but one exception, I think, Princes of Wales, and known more generally, therefore, under that title.—*J. R. S. C.*

ASSOCIATION OF ANIMALS.—I conceive that one of the chief uses of your excellent periodical is that it affords a medium of communication for young naturalists seeking for information on any point. With this feeling, I venture to ask your readers for any information they can give me regarding the strange alliances or associations of various animals, as in the case of the pea-crab living with mussels, &c.; the fishes seen by Mr. Peach, Dr. Collingwood, and others, that live under the disc of the sea anemone; the worm found by Mr. Lord in the mouth of a British Columbian limpet, &c. I should also be glad of information regarding cases of alliance for offence or defence, as in the case of the sword-fish and the thresher, which combine to attack the whale.—*O. E. D.*

CAT-HAWS.—In answer to Mr. Ranson's query on cat-haws, I forward you one or two extracts. Brockett's "Glossary of North Country Words":—"Cat-haws.—The fruit of the whitethorn, perhaps named from *cates* food, because they may be eaten as such by human beings. When large they are called *bull-haws*." Johnston's "Natural History of the Eastern Borders" says the fruit is called *haws*. The name is derived from the Anglo-Saxon hàia, which signifies a hedge. In 1561, to defend the villages of North Durham against the raids of the Scotch moss-troopers, hedges were ordered to be planted around the "little closes or crofts" lying hard by the village, and the hedge was to be "a dooble set of quicksett and some ashes." There is further lore on the subject in the book.—*R. Y. G.*

CAT-HAWS (pp. 70, 93, 94).—This name is also applied to the fruit of the Hawthorn in the north of Lincolnshire.—*James Britten, High Wycombe.*

RED GROUSE.—Does the Red Grouse (*Lagopus Scoticus*) pair, or is it polygamous? In Mudie's "British Birds" we are informed that they do not pair, whilst the Rev. J. C. Atkinson, in his "British Birds' Eggs and Nests," as distinctly states the contrary.—*H. C. Sargent.*

BARBARY APE.—Are there any individuals of this species of monkey living at Gibraltar in a wild state now? The "Guide" to the Zoological Gardens for 1866 says that there were only three alive there in that year.—*H. C. Sargent.*

POCKET [COLLECTING-BOX.—Mr. Letchford, the celebrated match-maker, has brought out a new box for the "Cachou aromatisè" for smokers. He calls it the Prince of Wales's. These boxes appear to me admirably fitted for the collector of small insects, shells, &c., as they are so readily opened and closed. Larger ones might be advantageously made on the same principle.—*Charles Adcock, M. R. C. S., Jersey.*

TENNYSON (p. 91).—"J. R. S. C.'s" query reminds me of another passage in "In Memoriam," of the interpretation of which I am doubtful. What is "the blue sea-bird of March"? In "The Brook," as set to music, a misprint occurs which mars the sense: instead of "willow, weed, and mallow," it should be "willow-weed and mallow," *Epilobium hirsutum* being intended by the former name.—*James Britten, High Wycombe.*

COLD ST. VALENTINE'S.—The *St. Catherine's* (Canada) *Times* says:—"The 14th of February will long be remembered as an extraordinary day. The whole country became an immense glacier, and the eye was regaled with delicate fringes of icicles pendent from fence rails, housetops, and the branches of trees. The more tender varieties of fruit and ornamental trees are badly injured in every direction—literally smashed down with the weight of ice formed upon them during the night. Peach-trees have suffered most, many of these being entirely ruined. About six years ago we had just such another spell of weather, and, strangely enough, there was an abundant crop of fruit the following season, notwithstanding the destruction of many choice trees. A Montreal paper states the fall of snow this winter at no less than 118 inches."

A PINING TORTOISE.—A friend has a tortoise he cannot get to eat or drink anything. What must be done with it? I am aware the tortoise will live during the winter without food, but now (April) it must surely be time for it to break its long fast.—*J. H.*

Littorina littorea.—An instance of the power of this mollusk to live out of its native element came before me lately, and may not be uninteresting to readers of Science-Gossip.—On the 13th of February I procured some specimens from Rothesay, for the purpose of examining the odontophore; but as other things demanded attention at the time, I put them in a tin-box till their turn should come. On going to look at them a fortnight after, I was astonished to find them alive, and rolling out their dry and thirsty tongues as if craving a drop of water. Not having any sea-water at command, I placed them in fresh water, and kept them there for a day; but they did not seem to take to it, retiring to the remotest recesses of their domicile. They were again placed in their iron prison, and daily watched till the 8th of March, up to which time they remained active, pushing out their tentacles, and contracting instantly when touched, though apparently with diminishing strength. On looking at my prisoners shortly afterwards, the vital spark had fled. A *purpura*, their companion, died in a few days after its removal from the shore.—*Wm. Haddin, Glasgow.*

The Hag-fish, or Borer (*Myxine glutinosa*).—I hear that this creature is common on the east coast of England. I am unable to procure a specimen hereabouts, and I am much in want of one, being engaged in the study of the *Cyclostomata*. If any one who has the opportunity of getting one fit for dissection, will forward it to me, I shall be exceedingly obliged. — *Major Holland, Bury Cross, Gosport.*

Vorticellæ.—H. Ashby says, in the April number of the Gossip, that the newly separated Vorticella "swims off to hang on its own hook, or rather its own thread." This statement is frequently made. Have any of my fellow-readers and observers seen a thoroughly satisfactory instance of the development of the "stalk" from a newly-formed or divided Vorticella?—*G. S. R., Louthport.*

The Tolmen.—A huge granite rock, extensively known as "the Tolmen," in the parish of Constantine, Cornwall, was destroyed during the past month. The famous block was oval in shape and weighed about 800 tons; it was 33 feet long, 14 feet high, and 19 feet in breadth. It rested on the point of two detached rocks, and underneath it was a free passage. One of the supporting rocks was blown down, and the Tolmen fell into a quarry, a distance of 40 feet.—*The Times.*

Having been informed some weeks ago by the Rev. Mr. Winwood that the Tolmen was in danger, I put myself in communication with the proprietor, Mr. Haskin, intending to offer some compensation for, or, if possible, to acquire it permanently for the nation; but I was assured that there was no reason for any anxiety on the subject. The mischief done is of course irreparable, but every right-minded man must condemn the wanton barbarism of him who has thus destroyed, for the mere sake of the granite on which it stood, a monument which old Borlase called the "most astonishing of its kind."—*Sir John Lubbock, in the Times.*

Cats before a Storm.—I have often seen our cat scratching or clawing—a chair, for instance—before a storm, and have not observed it at other times. One fine evening, a friend, seeing her at it, observed, "We shall have a storm to-night;" and so we had. *Query.—Are* cats aware of an approaching storm?—*J. H.*

The round-leaved Sundew.—In reply to Mr. Spicer's query, I may say that I have twice seen flies caught on the ciliated leaves of the Sundew, *Drosera rotundifolia* and *D. anglica*, and many times I have seen dead flies, gnats, and aphides in these minute traps of Flora, as a lady now with me has also. Our observations were made on some bogs in the neighbourhood of Poole, where the Sundews were very common. I also proved the reputed corrosive character of the juice adhering to the irradiating hairs of these plants, as described in my little book of science for boys, "Tommy Try," p. 226:—"I carefully collected with a pin about a grain of this viscid secretion in a homœopathic bottle, and used it for some experiments. I found it vesicated the skin, even when applied in the most minute proportion, and when the eyes of insects were touched with it, they were more affected than by the most corrosive mineral poisons."—*C. O. Groom Napier.*

Sundew.—In reply to W. W. Spicer, I beg to say that on two occasions I have found the leaf of *Drosera rotundifolia* rolled over so as to enclose a fly. On the last occasion a leaf had in it one living fly, but so covered with the viscous fluid secreted by the glandular hairs as to be without any chance of escape; and also the remains of another fly, apparently of the same species, which had probably dismembered itself in efforts to escape from its "Slough of Despond." The hairs were interlaced just as in *Dionœa*, but of course not so closely.—*Robert Anslow, Wellington, Salop.*

Sundew.—When in Hampshire two years ago, I often found *Drosera rotundifolia* with small flies, dead, enclosed by the hairs on the leaves, but I never saw one in the act of being caught.—*W. H. Beeby.*

A Geological Puzzle (p. 95).—A change of conditions similar to that shown by "W. B.'s" section is by no means uncommon. Is not each seam of coal underlaid by a bed of shale, its "underclay," and overlaid by another bed of shale, its "roof"? To explain such alterations of strata, we have only to imagine a submerged tract of land, first raised above the surface of the water, and then, after a time, again submerged; and this frequently occurs, even in the present day.—*John Hopkinson.*

Tennyson as a Naturalist—Violets under Ash-trees.—I think here our poet has used poetic license, for I have almost invariably found the vicinity of ash-trees detrimental to all other vegetation. An ash-tree in the neighbourhood of a field is quite sufficient to make the grass scanty, I have often seen it almost entirely eradicated by it; and even in a wood it exercises a baneful effect on the growth of all surrounding trees. Some botanists say that this is occasioned by the great amount of nutriment which the Ash absorbs from the soil, rendering it but a poor support for vegetation; others that the plant itself is poisonous. I incline to the last hypothesis, for the leaves are known to be detrimental to sheep and cows. Elder is another tree which appears to do no good to its neighbours, and few birds will build in it.—*C. O. Groom Napier.*

Hagg-Worm.—A short time ago the pages of the Gossip were enlivened with a discussion about the term Hagg. Referring to which, I would state that in this neighbourhood the common green snake is called "hagg-worm."—*Wm. Wheldon.*

Rare British Animals.—In a letter I had from my sister a few weeks ago, she says that a relation of ours residing at Plymouth recently set a live-rat trap, and on looking at it in the morning, was surprised to find a female Black Rat (*Mus rattus*) in it, and some young ones trying to get at her. On opening the door of the trap a little, they ran in and settled down comfortably with their mother.—*H. Budge, Islington.*

Otter.—Early in 1865 an otter about a month old was found by a dog in Fish Row, Oulton Broad, near Lowestoff, and given by its captor to Mr. Isaac Beaumont, of Prospect Place, Mutford Bridge, who by a little care and kindness completely tamed it, so that it answered to its name, Peter, like a dog, and would follow its master about his garden, as well as let him do anything with it, though strangers would soon find that Peter could bite. He was fed on flesh, or, when fish could be procured, they were placed in a large bucket of water, into which Peter would dive, taking them alive. It eventually became so attached to its master that it refused to go into the Broad, though let loose, and urged by its master to take the water. It was unfortunately starved, in consequence of its owner being unable, through a severe accident—a broken arm—to procure fish for it. Another otter was shot in February last about the same place; showing that they still inhabit this fine piece of water.—*F. R. M.*

The Otter, Badger, and Black Rat.—A few otters are still to be found in the river Frome, Somerset, a tributary of the Lower Avon: one was shot there some five or six years ago. The contamination of the stream by the cloth-dyers renders the fishing of little value, else I fear that times would be even harder with the poor otters and kingfishers than at present. The Badger has not been seen in this neighbourhood, so far as I can learn, for many years; but a few years ago I saw the dead body of one not very long killed, among the bushes at the Pinhay Cliffs, Devon, near Lyme Regis. I am informed by a rat-catcher of great experience in these parts, that in addition to white and piebald individuals, he has on two occasions taken black rats, smaller than the ordinary rat, one near Westbury, Wilts, the last about a year ago, in a barn near Road, Somerset.—*H. J. P.*

Rare British Animals.—In the parish of Campsie the killing of otters is not a very rare occurrence; one, the skin and head of which I saw, was killed in the month of May last year; another was caught in a trap last month: they were both old ones, and were caught at the same stream, which flows from the Campsie fells, and is filled with good-sized trout. The only case in which a badger was caught, was a number of years ago; but it was only by chance I heard of the otters, and there may have been badgers caught lately, without my having heard of it.—*David Macnab, Lilylwin, Milton of Campsie, near Glasgow.*

The Badger.—Your correspondent, Robert Morton Middleton, will perhaps be interested to know that there are several badgers in a piece of gorse on a farm belonging to Earl Harrowby, in the parish of Willersey, Gloucestershire. Three have been destroyed within the last twelve months, but there are yet some remaining. This information I obtained from the farmer who occupies the land.—*Anne Halford, Willersey, nr. Broadway.*

The Hawthorn.—The unusual mildness of the season has occasioned the hedges in our neighbourhood to assume the appearance of spring in winter. The Hawthorn not only put forth leaves, but I found whole *branches* with the blossom-buds fully developed, on the 21st of February.—*Anne Halford, Willersey.*

Use of Stones by Spiders.—Like many other persons, I have observed a small stone suspended from a spider's web, but I must confess to considerable doubt as to the suspension being the intentional act of the Spider. It seems to me far more probable that the stone at the time the thread was attached to it was quietly reposing on the ground, and that subsequent shrinking of the threads, or some change in the position of the web's supports, raised it from the earth. If, as is so frequently the case, one of the main cords of the web was attached to a growing shrub, a light pebble would be very likely to be raised in time, as described. By whatever means, intentional or otherwise, the stone came into its pendent position, the Spider might find it advisable to steady it with other threads when he found it, like "the Cavalier's" ladder of ropes, "swinging about in the breeze."—*George Guyon, Ventnor, Isle of Wight.*

Fish-moth.—"W. O.," at page 94, inquires what is the scientific name of "a small insect called the Fish-moth about here?" As no address is given, "about here" is somewhat vague; but from the brief description I have little doubt that the insect in question is *Lepisma saccharina*, which here, in the Isle of Wight, is known as the *Sugar-moth*, but in most parts of England I believe, is called the Sugar-louse (not the Sugar-mite, which is quite a different thing). It occurs in this house, but my servants tell me they are not aware that it any way injures textile fabrics. They say it will endeavour to find its way to the sugar-basin, thus evincing the taste for sweets indicated both by its English and classical names, but it so often frequents rooms where no provisions are kept, haunting cupboards, window-frames, &c., that it must be independent of a saccharine diet, and seems to exist anywhere if the woodwork is somewhat old. A very similar, but larger insect, occurs here under stones in damp situations, and from its tapering form and pearly lustre, a friend of mine used to term it "the fish upon legs:" it is described under the name "Bristle-tale" or Machilis, in Gosse's "Evenings at the Microscope." Both genera furnish scales which are good objects for microscopical study.—*George Guyon, Ventnor, Isle of Wight.*

Hare's Fur in Winter.—Mr. Busk communicated a paper, by Mr. Francis H. Welch, Assistant-Surgeon, 22nd regiment, at a recent meeting of the Zoological Society, containing observations on the American Hare (*Lepus americanus*), especially in reference to the modifications in the fur consequent on the rotation of the seasons, and the change of colour on the advent of winter. Mr. Welch's observations on this hare were based on specimens obtained in the province of New Brunswick, North America.

Snipe.—A few days ago, while out shooting herons about five miles from Exmouth, I shot a "snipe," flying northward across the sea. Can any of your readers account for this very strange occurrence?—*W. P. C.*

Hemlock (*Conium maculatum*), derived from the Greek *konao*, to whirl round, in reference to the giddiness caused by eating the leaves. Having read an article in the *Pall Mall Gazette* for March 25th, in which Hemlock was pronounced by Mr. Harley and other toxicologists to be no poison, nor even a medicinal remedy, I am anxious to know how this agrees with various writers, who all attribute to it deadly properties. Professor Henfrey mentions that many of the Umbelliferæ are poisonous; viz., *Conium maculatum*, *Æthusa Cynapium*, *Cicuta virosa*, *Œnanthe crocata*, and other species, although they *appear to lose the property under certain circumstances;* and another writer states that much of the strength of this plant depends upon soil and climate. In northern latitudes—Russia for instance—it is eaten with impunity; in Italy, Greece, and Spain, it is poisonous in *small quantities*. Analysis by Schrœder—resin, extractive gum, albumen, a green fecula, various saline substances. Brande discovered an odorous oil, and an alkaline principle possessing a strong narcotic smell and a nauseous taste, insoluble in water, and in doses of half a grain producing dangerous symptoms. This substance is named Conia or Conein, $C^{17}\,H^{17}\,N$. Geizer obtained an alkaline principle in the form of a volatile liquid, which had a yellowish colour, and a strong naseous taste, and an odour resembling Hemlock and Tobacco; it is sparingly soluble in water, and has a strong alkaline reaction, neutralizing acids, uncombined in the form of salts: *it is actively poisonous*. Used in the Materia Medica under the designation of "Conii Folia et Fructus," and seems to be of great benefit in many instances. The effects in large doses are vertigo, dimness of sight, nausea, faintness, and general muscular debility; in larger doses the pupil becomes dilated, difficulty of speech, delirium or stupor, tremors, paralysis, convulsions, death. This medicine varies much in its strength if procured from different places or persons. If this belief of its being innocuous should become popular, there is no knowing what serious accidents might occur, and I think this matter should be well looked into before Mr. Harley's view is adopted by the general public.—*Samuel A. Brenan, M.R.D.S., Vicar of Cushendun, Co. Antrim.*

A Sand Query (p. 95).—Can the circumstance mentioned by your correspondent have any connection with the luminosity observed when we walk on the sands at night? I have frequently seen a phosphorescent appearance where, and only where, my feet have impressed the wet sand. I supposed it to be due to a microscopic animal, but have not detected anything in the sand (under the microscope) to confirm this supposition. A similar appearance, which I think is mostly due to the reproductive Medusæ of hydroid zoophytes, may frequently be observed in the sea, close to the shore.—*John Hopkinson.*

Tormentil (p. 91).—Mrs. Watney must surely know that *size*, by itself, is of very little value as a distinguishing mark between species. It is especially so as regards the Tormentil: even on the Surrey commons, where I first became acquainted with it, the flowers varied greatly in size, but never approached those of *P. reptans* in this particular; but in Mid-Cheshire, where Mr. Holland directed my attention to it, the blossoms are as large as, or even larger than, those of *P. reptans:* and five-petalled forms are nearly as common as four-petalled ones.—*James Britten, High Wycombe.*

Large Aerolite.—About five o'clock on Saturday morning a very large aërolite, travelling from east to west, was seen over this city. It exploded with a loud report, causing violent vibrations in the air, which were felt as far as Penrith on the south, and Newcastle on the east. A man, who was preparing for market at Kirkbride, witnessed the strange phenomenon, and he describes it as "like a wap of straw" in the sky; another account likens it to a pillar of fire "of the size of an ordinary gate-post," and emitting great heat.—From *The Carlisle Journal* of Tuesday, April 6th. I may state, the report was distinctly heard here (Lamplugh), a distance of forty miles from Carlisle.—*J. Bowman.*

Snakes.—It is well known that a poisonous snake can be distinguished from a harmless one by the diamond shape of its head, which frequently has also a diamond spot on it; the head of non-venomous snakes being oval. Is this merely intended to enable us to distinguish them, or has it also some connection with the possession, or otherwise, of poisonous organs?—*J. H.*

Hawk-moth.—A few mornings since (April), whilst I was dressing, a full-sized Hawk-moth flew across my room, flitted about the window for a minute or two, making its peculiarly sharp buzz, and then fell down on the table. I had it carefully taken into a conservatory, where it resumed its flight. Though the windows were all shut, to keep out a cold rain, in looking for it an hour or two after, I was unable to find it.—*W. B. B.*

Proliferous Cabbage-leaves.—"F. M. C." sends a leaf of cabbage with supplementary offshoots springing from the main leaf; some of the new growths are in the form of little cups raised on stalks. Such growths are not very uncommon, and they are interesting, amongst other things, in showing that there is no such absolute distinguishing character between leaf and branch as is usually supposed; for here we have a leaf giving off other leaves, just as a branch does.—*M. T. M.*

Companionship.—At the meeting of the Zoological Society on the 8th of April, Mr. E. T. Higgins communicated a note by Lieut. C. C. De Crespigny, on the singular friendship existing between a Malacopterygian fish (*Premnas aculeatus*) and a species of Sea-anemone (*Actinia crassicornis*), as observed by Lieut. De Crespigny on the sea-coast of Labuan.

Fossil Coral.—The specimen forwarded by "J. W. S." is identical with *Montlivantha Delabechii*, figured and described in Milne Edwards & Haime's "British Fossil Corals." The genus is entirely confined to the secondary and tertiary systems, being represented by the greatest number of species in the Oolitic and Cretaceous formations. The species forwarded for identification is recorded as having been met with in the inferior Oolite of Somerset, Dorset, and Gloucestershire. "T. R.'s" *Fungia patellaria* (?) is probably the same or an allied species, but no particulars being given regarding the structure of the specimen, the description of limestone, or the locality from whence it was procured, it is perfectly impossible to arrive at any satisfactory conclusion as to its identity. *Montlivantha* belongs to the solitary Lithophylliaceæ, a group of the Astreidæ, and not to the Fungidæ. The genus *Fungia*, as at present constituted, is entirely restricted to the existing seas.—*W. S. Kent.*

NOTICES TO CORRESPONDENTS.

E. M. H.—The "Anthora" of Gerarde is *Aconitum Anthora* of Linnæus.

E. J. W.—They are the crystals to which we alluded.

Q. E. F.—Dr. A. Wallace, Colchester, Essex.

W. A. F. and J. S. W.—On oak-leaf, the "oak galls" figured and described in a former volume. On orange, a Coccus (insect). See *Quarterly Journal of Microscopical Science*.

E. W.—In previous numbers the mode of drying flowers so as to preserve their colour has been discussed.

P. (Guy's Cliffe).—*Peziza vesiculosa*.

C. C. C.—"Pritchard's Infusoria." 4th edition, 1861, 36s., plain; Whittaker & Co. Smith's "Synopsis of British Diatomaceæ," 1856; Van Voorst, £2. 11s.

G. A. S.—We cannot promise. It is impossible to insert all the communications we receive that are approved.

J. C.—If original and good, they would doubtless be acceptable, but as the engraving would be costly, they must be artistic.

J. C. D.—What possible benefit can accrue from our continually naming mosses for you, just to save you the trouble of learning to distinguish them for yourself? We cannot encourage such systematic imposition.

G. H.—Had you read Science-Gossip for April carefully, there would have been no reason for asking the question. We *can* furnish information, but there is something essential in the reader which we have no power to furnish.

W. W.—The best plan to adopt, if printer's errors would be avoided, is to write plainly, so that there can be no doubt of the meaning. We are no great admirers of the book you allude to.

F. S.—We can only insert one exchange for any month for the same correspondent, unless he resides abroad.

S. J. B.—1. Very doubtful. 2. No good entomologist uses cotton.

W. C.—All the plants to which the Irish "Shamrock" has been referred are flowering plants.

A. C.—The ova of the toad are deposited in chains, and of the frog in a mass.

E. S. N.—Please send name and address to Mr. Robert Holland, Mobberley, Knutsford, Cheshire.

Stanley's Collecting-Case.—We observe with regret in the advertisement at p. xlii. of our last number that the maker of this case remarks, "See editor's opinion, Science-Gossip (No. 49), January 1, 1869." As we simply inserted his description of the case, as sent to us, without observation of our own, we decline, whatever our opinion may be, to have an opinion thrust upon us for advertising purposes; and therefore with all deference to Mr. Stanley, we must submit that the remarks referred to are his own, and not ours. Let our readers turn to the page in question, and they will find no opinion given by the editor.—Ed. S. G.

Belgravia.—Surely we have announced often enough that all communications not accompanied by name and address are at once destroyed without notice.

W. E. G.—Bentham's "Handbook of the British Flora," 12s.; Lovell Reeve & Co.

F. H. M.—No. 2 is *Pteris serrulata*.

A. A., Jun.—The common scale insect (Coccus), too plentiful in conservatories.

G. H. H.—There are stoppered and capped bottles, but none to answer all your requirements.

D. H. S.—The commoner British mosses are figured and described in "Stark's British Mosses," 7s. 6d.; Routledge.

J. D. H.—No. 1. *Onoclea sensibilis*. 2. Barren. 3. *Cyrtomium falcatum*. 4. *Pteris serrulata*.

F. R. B.—It is not strange to see a Brimstone Butterfly, even when the snow is on the ground. We have had so many notices of it during the past three months that we inserted none.

G. S. T.—We cannot undertake commissions. Your offer can be inserted as an advertisement. Write to the publisher.

W. P.—If your bird laid eggs, then it was evidently a "duck," notwithstanding its plumage being that of a "drake."

E. D. B.—The larva of a "bot-fly" (*Œstrus*).

A. H.—Yes, it is a common trick for spiders to feign death.

M. C.—Not in our line.

J. H.—For *Nais Scotica* see Dalyell's "Power of the Creator," vol. ii., p. 130, plate 17, figs. 1—5.

T. B. F.—The answer to your query, as we read it, is that hearing becomes less sensitive with age, "and nothing more."

E. B. should try a little "benzole," touching therewith the specimens attacked by mites.

D. H. S.—For *Zygnemaceæ* consult Hassall's "British Freshwater Algæ," or *Annals of Natural History*, first series, vols. ix. and x.

EXCHANGES.

American T and F Shells for Foreign Bulimi or the rarer kinds of British Shells.—G. Sherriff Tye, 58, Villa Road, Handsworth, Birmingham.

Mosses.—*Racomitrum ellipticum* and *R. protensum* (both in fruit) for *Desmatodon latifolius* or *D. nervosus*.—Joseph Bowman, Cockan, Lamplugh, Cockermouth.

A Few Slides of Diatomaceæ (named) or other Microscope Objects wanted for a small collection of Alpine Plants from Mont Blanc, Pic du Midi, &c.—R. Anslow, Leegomery Road, Wellington, Salop.

Oblique and Vertical Sections of *Pteris aquilina* (showing Scalariform Ducts) in exchange for other good objects.—Send lists to John Carpenter, Waltham Cross, Herts.

Lepidoptera.—Species of Northern United States for those of England, Germany, India, and Australia. Also correspondents solicited.—W. Webster Butterfield, M.D., Indianapolis, Indiana, U.S. of North America.

For Carp Scales send stamped and directed envelope to F. T., Post-office, Rugeley, Staffordshire.

Correspondence and Exchanges wanted in Terrestrial Conchology, with American, Continental, and Colonial Conchologists, by Alfred Taylor, Hezmalhalch Yard, York Street, Leeds.

Well Mounted Slides of Reproductive Organs of Moss (*Bryum ligulatum*) for other well mounted objects.—John H. Martin, 86, Week Street, Maidstone.

Fossils from Chalk for Fossils from any other formation. Address, F. Stanley, Royal Sea Bathing Infirmary, Margate.

British Ferns.—*Polystichum lonchitis*, and *Polypodium alpestre*, for other rare species or varieties.—J. Morley, Jun., Sherbourne Road, Bolsall Heath, Birmingham.

Ferns, British or Continental, wanted for Canadian species, in good condition.—Lists on application to "Canadian," care of the editor of Science-Gossip.

BOOKS RECEIVED.

"Does Education Lessen Crime?" by William H. Groser, B.Sc., F.G.S. London: Longmans.

"Le Naturaliste Canadien," publié sous le patronage de l'Institut Canadien de Quebec. Nos. 2, 3, 4. January, February, and March, 1869. Quebec: 8, Rue de la Montagne.

"The Gardener's Magazine." Part XL. April, 1869. London: E. W. Allen.

"Land and Water." Nos. 166, 167, 168, 169.

"Report of the Rugby School Natural History Society for the Year 1868." Rugby: W. J. Tait & Sons.

"Darwinism," a Lecture delivered before the Torquay Natural History Society, February 1, 1869, by Thomas R. R. Stebbing, M.A. London: Simpkin, Marshall, & Co.

"The American Entomologist." No. 7. March. St. Louis, Mo.: Studley & Co.

"Proceedings of the Bristol Naturalists' Society." Vol. iv. Part I.

"Report on the Culture of the Japanese Silkworm (*Bombyx Yama Mai*) in 1867-8 in England," by Alexander Wallace M.D. Colchester: Benham & Harrison.

"The Monthly Microscopical Journal." No. 4. April, 1869. London: Robert Hardwicke.

"The Popular Science Review," for April, 1869. London: Robert Hardwicke.

"The Dental Register." Vol. xxiii. Nos. 2 and 3. February and March, 1869. Cincinnati: Wrightson & Co.

"Proceedings of the Portland Society of Natural History." Vol. i. Part II. Portland, Maine, U.S.

"Quarterly Magazine of the High Wycombe Natural History Society." Vol. ii. No. 4. April, 1869.

"The American Entomologist." Vol. i. No. 3. November, 1868. St. Louis, Mo.: Studley & Co.

"Scientific Opinion." Part V. April, 1869. London: Wyman & Sons.

"The Journal of the Quekett Microscopical Club." No. 6. April, 1869. London: Robert Hardwicke.

Communications Received.—W. W. S.—E W.—D. A. P. W.—J. W. G.—W. D.—J. H. R.—J. P. S.—D. H. S.—R. H.—A.—E. U. W.—W. W.—A. R.—G. E. Q.—E. J.—T. P.—A. A.—J. M.—T. H. W.—J. H.—E. A.—F. J. W.—F. B.—W. W.—E. W.—T. B.—C. B.—H. G.—A. J. B.—G.—H.—J. J. S.—F. H.—F. W.—G. B.—I. D.—W. R. T.—C. E. O.—W. H. G.—F. S.—C. E.—E. G.—E. J. W.—R. A.—T. P. F.—J. H.—Q. E. F.—G. S. T.—W. H. B.—A. H.—C. J. M.—C. O. G. N.—J. S. W.—J. T. Y.—F. M. C.—H. E. W.—J. B.—T. P. B.—E. W.—C. C. C.—W. B. L.—J. C.—A. J.—W. S.—E. D. B.—F. B.—S. A. B.—G. A. S.—H. C. L.—P.—T. S.—J. B.—B. W.—J. H.—J. A.—T. D. R.—McV.—J. H. M.—J. H.—C. C. W.—S. E.—D.—R. M. H.—W. H. J.—F. W. C.—J. H.—C. W. T.—G. G.—H. B.—F. W.—M. L.—A. S.—J. R.—J. T.—J. S.—R. T. A.—E. H.—A. A.—W. H.—F. W.—G. B.—J. B. B.—C. H. G.—F. J.—J. H.—G. O. G.—J. S. P.—M. P.—W. E. H.—F. R. B.—W. B. B.—H. E. W.—N. P.—G. S. T.—F. K.—E. D. B.—P.—W. T.—J. F. W.—J. H.—A. J. J.—W. T. G.—J. H. (N.W.).—M. C.—E. B.—F. T.—A. H.—C. S.—W. H.—R. B.—I. W.—W. W. B.—F. S.—J. P. F.—S. S.—J. B.—W. N.—A. T.—A. H. W.—G. H. C.—G. H.—W. J. D.—A. C.—T. S.—S. J. B.—W. C.—J. C. R.—B. B. H.—G. S. R.—J. H.—W. H.—S. A. S.—F. S.—W. W.—T. G.—J. H. W.—J. A. H.—T. G. S.—F. B.—A. G. P.—H. B.—H. C. S.—W. E. B—G. G.—F. R. M.—J. M., Jun.—H. F. P.—W. E. G.—F. H. M.—A. A.—B. B. H.—G. B.—C. A.—W. A. F.—J. E. T.—E. A. N.—J. S.—W. J. T. H.

SPRING FLOWERS.

THE stereotyped heading, "Mildness of the Season,"—so amusing to a naturalist when found (as in local papers it often is) in conjunction with a January Dandelion or a Christmas Primrose—so frequently appears, year after year, in naturalists' periodicals, that a critic might remark that each successive season seemed to be earlier than its predecessor. Yet I would preface these somewhat disconnected remarks with a few brief notes on the flowering-time of plants during last spring, in order that they may be contrasted with the dates of the same plants as given in Gossip for May, 1868. The mild weather which ushered in the year induced a number of flowers to put in an appearance long before they were due; and until the beginning of March this continued: but towards the middle of the month cold weather set in, and vegetation remained almost stationary for at least a fortnight. The result of this was, that while many plants blossomed much earlier than usual, others, from the sudden check, were kept back until their usual time of appearing.

The following are the dates to be compared with those given last year:—Windflower (*Anemone nemorosa*), March 3; Goldilocks (*Ranunculus auricomus*), April 12; Meadow Crowfoot (*R. acris*), April 4; Great Stitchwort (*Stellaria Holostea*), March 2; Wood Sorrel (*Oxalis Acetosella*), March 26; Moschatel (*Adoxa Moschatellina*), March 1; Golden Saxifrage (*Chrysosplenium oppositifolium*), April 10; Cowslip (*Primula veris*), March 2; Mezereon (*Daphne Mezereum*), February 21; Wood Spurge (*Euphorbia amygdaloïdes*), March 2. The Daffodil and Toothwort I omitted to note on their first appearance; hence they are not entered above. Four of these plants appeared later, the remainder earlier, than last year. As an evidence of the sudden check to which I have referred, I may remark that between the 3rd and the 26th of March, only three wild flowers put forth their first blossoms in this neighbourhood, as far as I can gather from the observations of careful "searchers of simples" who have assisted me in compiling my kalendar. The Hawthorn (*Cratægus oxyacantha*) was in blossom on April 26 in several localities; and the Coralwort (*Dentaria bulbifera*), which Mr. Syme, perhaps wisely, considers a *Cardamine*, flowered on April 12: the former six, the latter five, days before its earliest date during the last five years.

In the Wycombe district, Violets of each Buckinghamshire species have been remarkably abundant and luxuriant this season; remarkably rich, too, in aberrant forms. Of the Sweet Violet (*V. odorata*) I found two tufts, in a lane leading from Downley to West Wycombe, having deep claret-coloured blossoms; and adjoining the same lane was a large plot of a pink-flowered variety of the same species. Although the form *V. imberbis*, Leight., is said to be common, I have been unable, by diligent search, to discover it in this neighbourhood; but, curiously enough, I found *one* blossom in which *one* of the lateral petals wanted the usual tuft of hairs. The Hairy Violet (*V. hirta*) has this year behaved in a most unexampled manner, apparently with the object of becoming as much unlike itself as possible—an object which it has certainly attained. I have gathered specimens which had the scent of *V. odorata*, but the leaves of *V. hirta;* others which were scentless, but approached *V. odorata* in the shape of the leaves, as well as in their less conspicuous pubescence; and one specimen, with the leaves and flowers of unmistakeable *V. hirta*, had the con-

spicuous elongated scions, rooting at the extremity, which are supposed to characterise *V. odorata*. This plant, I suppose, corresponds with one referred to in "English Botany" (ii. 18), which was sent by Mr. J. G. Baker from Seafield, in Mid-West Yorkshire, "which he supposes to be *V. sepincola* of Jordan." My friend Mr. Holland will be amused at my citing instances like this, which tell so forcibly against my own theories as a "splitter"; but the horrible fate of Professor Ptthmllnsprts in "The Water-Babies," who ignored facts which did not coincide with his theories, is a warning which none but the most hardened could contemplate unmoved; besides, our great object is to arrive at the truth, and he would be unworthy of the name of a naturalist who would suppress facts simply because they run counter to his theories. But to return to *V. hirta*. Several pale-blue and white-flowered specimens have been gathered this season; and the species has continued in blossom longer than usual: I found some as late as May 2nd. One plant which was brought to me had very small and numerous white flowers, and small pale leaves; the rootstock was remarkably branched, and neither flower-stalks nor leaf-stalks were more than an inch in height, the former being slightly the longer of the two. I have noticed this season that both *V. Reichenbachiana* and *V. Riviniana* have produced a great many well-filled capsules from the ordinary blossoms: during former seasons this has been comparatively uncommon, most of the fertile flowers being apetalous, and appearing later. Some of our later-flowering specimens of *V. Reichenbachiana* have very small petals, sometimes only three or four being present: Mr. Holland has sent me similar specimens from Mobberley, Cheshire, and looks on them as intermediate betwen the spring petalous blossoms and the apetalous ones of summer. But, as I have stated above, seed has this year been abundantly produced from the ordinary petalous flowers.

Mr. Hampden G. Glasspoole sent me two specimens of *V. Riviniana* from Yarmouth, each blossom of which had *two* spurs, one of the lateral petals being thus transformed: in other particulars the flowers were of the normal type.

In the notes on Oxlips of various origins which have appeared from time to time in GOSSIP, a variety of the Cowslip (called *Primula veris β major*) was referred to as one of the claimants of the name. As far as my experience goes, this is somewhat rare; but I have this year found one example of it in a field of cowslips: it had leaves like the Cowslip, but the corollas were nearly flat, and paler than usual: at the same time, they were not nearly so large as those of *Primula caulescens*, which has been remarkably fine with us this season. *P. intermedia*, the true hybrid between the Cowslip and Primrose, I have not yet met with. I notice in gardens a very pretty single Primrose with bright purplish flowers, which I do not remember to have seen before this year: it is of a better colour than, and in every way far preferable to, those double, artificial-looking lilac Primroses, which remind one of the hideosities which used (*lucus a non lucendo*) to be called "violets," and were worn in ladies' bonnets. There is a superstition here that these "spring flowers," as they are called, may be produced by planting a common Primrose root in cowdung; while Polyanthuses may be obtained by placing a Cowslip root upside down in soot! This latter notion is very widely diffused; in fact, the "folk-lore" connected with Primroses would make by itself an interesting paper.

The Windflower (*Anemone nemorosa*) has blossomed very abundantly this season. This is one of the plants which, even in a wild state, not unfrequently become double: and this doubling is accomplished in two ways; either by the conversion of the stamens into petals (or sepals?) corresponding in size with those which are usually present; or by their transformation into almost linear petals, about half as long as the sepals. The reddish-purple or bright pink tint noticeable in some specimens of the common form, especially when beginning to fade, is very beautiful. Occasionally, however, a pale blue shade is to be observed; but this, I fancy, is rare. The only specimens I have seen thus coloured were some sent me last season by a kind friend, who fancied they were flowers of *A. apennina*. In a bed of Anemone leaves we shall notice a few on taller stalks than the rest, and if we gather them, we shall find them covered with little whitish dots, which are a species of *Æcidium*;* a leaf of Anemone thus affected is figured in Ray's "Synopsis" from a specimen in Bobart's herbarium, and was for some time known as "the Conjurer of Chalgrave's Fern."

Those interested in the preservation of our rare plants will be glad to know that *Daphne Mezereum* still holds its ground in two woods near Wycombe, one of which is now being inclosed for game; consequently, unless it attracts the notice of the game-keepers themselves, we may hope that the villagers, who greedily transplant to their gardens all that they can find, will be deterred from hunting for and extirpating the Mezereon in one, at least, of its localities. And here I bring my spring gossip to a close, wishing my readers one-hundredth part of the pleasure in reading it that I have derived from observing the plants mentioned in it.

High Wycombe. JAMES BRITTEN.

[* *Æcidium leucospermum*. The fungus affecting the leaves of the wood anemone, figured in Ray's "Synopsis," was not this, but a species of *Puccinia*, more common than the Æcidium, the brown pustules of which bear a greater resemblance to the fructification of a fern. See "Microscopic Fungi," p. 60.—ED. S. G.]

THE ANATOMY OF THE ZEBRA MUSSEL

(*Dreissena polymorpha*).

DREISSENA POLYMORPHA is originally an inhabitant of the rivers in the Aralo-Caspian province.

Thence it found its way into the European rivers, and was recognized by Linnæus as a member of the European fauna.

The shell in the early part of this century became well known to collectors under the names of *Mytilus polymorphus* and *Mytilus volgensis*; but it did not receive much attention from naturalists, and, in fact, its true zoological characters were entirely unknown until the year 1826.

At this date it was found by M. Dreissens, an apothecary of Louvain, in a river near that city, and was by him sent to M. Van Beneden, director of the Louvain Museum, who described its anatomy minutely before the French Academy, pointed out in what manner it differed from Mytilus, with which genus it had been placed, and, recognizing it as the type of a new genus, named it *Dreissena*, after M. Dreissens. Van Beneden's paper on the subject is published in the *Annales de Sciences Naturelles* for 1826.

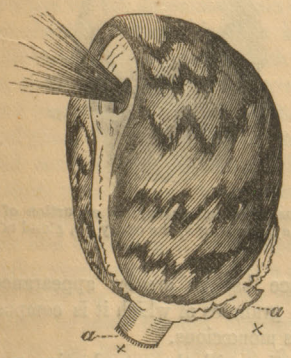


Fig. 88. Animal and shell of Dreissena. *a*, *a*, siphons.

Its first discoverer in England was Mr. J. Sowerby, which it in 1824 at the Surrey Docks, which it is supposed to have reached on some floating timber. It was next found on timber at Wisbeach in 1828; then in the Union Canal, Scotland, in 1834; and in the Neone in 1836; finally, at Exmouth, in 1846. We have thus five distinct centres of introduction into Great Britain. From these Dreissena has spread far and wide, and is to be found throughout the vast canal system in England and in the several rivers connected with it. As far as I have been able to ascertain, it is not found in Ireland.

Let us now turn to the anatomy of the Dreissena.

1. *Of the nervous system.*—This consists, as in most of the acephalous mollusks, of several pairs of ganglia.

One pair lies immediately over the œsophagus, and sends out various branching nerves to the labial appendages—the mouth and the parts immediately surrounding it. Another and larger pair, called the branchial ganglion, is situated near the posterior adductor muscle, and supplies the branchiæ and surrounding parts with nerves. A single small ganglia, with its nerve branches, is placed near the siphons.

Such is the very simple nervous system of Dreissena. The various senses must of necessity be but slightly developed. Eyes, although present in some bivalves in a rudimentary state, do not appear to exist in the Dreissena: the senses of smell and taste, if they exist at all, must be of the weakest. The auditory capsule, which has been detected in some few bivalves, does not appear to be present in this one: the sense of touch, however, is evidently rather delicate.

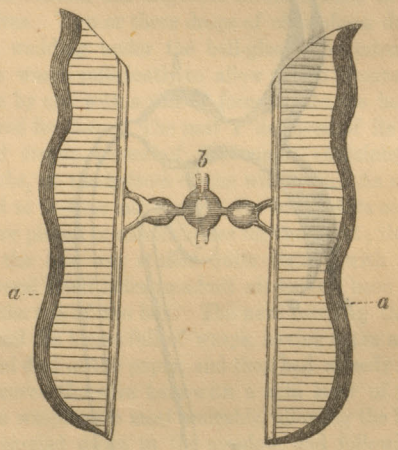


Fig. 89. Circulatory system. *a*, *a*, branchiæ; *b*, the heart.*

2. *The circulatory system.*—The heart, which is situated on the back of the animal immediately under the skin, consists of a single central ventricle and two auricules, one on each side. These receive the blood from the branchiæ, of which there are two pairs, one on each side of the animal, communicating freely with the branchial cavity. The auricles in turn transmit the blood to the ventricle, whence it is distributed through the body.

3. *The respiratory system.*—Respiration in the Dreissena, as in other bivalves, consists in the exposure of the blood to the influence of water containing air. This process is performed by means of the movements of the mantle, with its siphons, and the gills, or branchiæ. As before mentioned, there is a pair of gills on each side of the body. Each gill is composed of two laminæ, divided

* The woodcuts are engraved fac-simile from the author's sketches.

internally by septa into a series of narrow chambers, the divisions being marked externally by lines. These chambers open into longitudinal channels at the base of the gills, which unite at the commencement of the exhalant siphon. Under the microscope the gill laminæ exhibit a network of blood-vessels, fringed with cilia, opening into the gill-tubes.

The mantle which envelops the whole animal has three openings—one a small slit on the side, through which the foot and byssus pass; the others are in front, and are prolonged into siphons. One, the branchiala inhalent, has its orifice surrounded by a double fringe of tentacles; through this the water enters, distributes itself over the gills, and passes out at the other, or exhalent siphon; thus a continual current of water flowing in and out is constantly kept up.

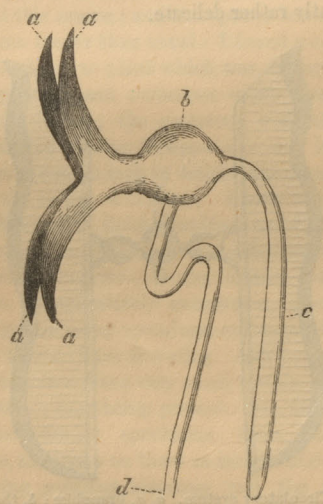


Fig. 90. Digestive system. *a*, *a*, labial tentacles; *b*, stomach; *c*, cæcal appendage; *d*, intestine.

4. *The digestive system.*—The mouth is placed between the anterior nervous ganglia. The orifice is protected by two lips, which are prolonged on each side into a pair of membranous palpi: these are called the labial tentacles. The œsophagus is short, of the same size as the mouth, and is entirely enveloped by the ovary and liver. The stomach is situated between the heart and the anterior adductor muscle, and is also enveloped on all sides by the ovary and liver. This viscus is irregularly round in form; the upper surface is smooth and homogeneous, the lower is permeated by numerous small openings which give entrance to the biliary ducts. On the left side there is a long cæcal appendage nearly equal in length to the intestine, but of finer texture.

The intestine which springs directly from the lower end of the stomach is thick and whitish. It runs obliquely forwards, from left to right of the median line of the body, plunges into the liver at its posterior extremity; there it bends round, and returns upon itself on gaining the back of the animal where it is immediately under the skin; then, after passing round the heart, it again bends upon itself just above the posterior adductor muscle, and terminates at the exhalent orifice of the mantle.

The liver is large, forming with the ovary, with which it is ultimately united, although not of course anatomically connected, by far the largest portion of the body. It pours its secretion by a number of minute canals into the under surface of the stomach, as before mentioned. Its chief mass is situated over the stomach, and it extends forwards and backwards.

5. *The reproductive system.*—As before mentioned, the ovary is of great size. It is at once observable on removing the shell, from its brilliant yellow colour.

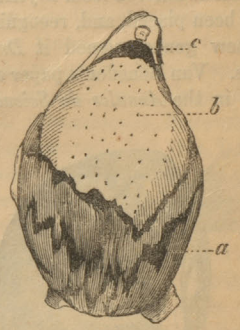


Fig. 91. Animal with left valve, and a portion of the mantle removed (*a*), showing *b*, the ovary; *c*, gland of Bojanus.

Its surface has an areolar appearance, caused by the fine granules of which it is composed. The Dreissena is monœcious.

In connection with the reproductive system, it is necessary to mention the existence in Dreissena of that peculiar viscus called the gland of Bojanus, which in this animal is a small, dark-coloured body, situated at the apex of the shell. The structure of this gland is highly complex, and it has long been a puzzle to zoologists. It is composed of several cavities opening into each other. From its position and other circumstances, it is probable that it plays some part in the process of reproduction, but what is at present unknown.

6. *The muscular system.*—The muscular system is triple, or, rather, consists of three distinct muscles, two of which serve to move the valves of the shell, and a third which regulates the movements of the mantle with its siphons, and the foot and byssus. The former, named the adductors, are placed at the extremities of the valves of the shell,—one situated on a small shelf at the apex called the anterior, and

the other near the place where the valves open called the posterior.

The latter, which is called the retractor muscle, is of considerable size, and is divided anteriorly into two portions—one regulating the movements of the mouth, mantle, and siphons; the other, those of the foot and byssus. T. G. Ponton.

WASPS AS DOMESTIC PETS.

HAVING been much interested in the account, in "Homes without Hands," of the experiments made by Mr. Stone, in domesticating the Wasp for the purpose of observing its habits, I resolved to try, and though, from beginning late in the summer, I was unable to carry my experiment on as I should have wished, yet an account of the experiment, as far as it went, may not be uninteresting to some of your readers, if only to show that a *waspish* nature is an *amiable* one, though usually considered the reverse. I also give Professor Henslow's method of taking wasps' nests, a method far simpler than any I have ever heard of, and the efficacy of which I have proved.

The first thing towards the experiment was to prepare a box for the accommodation of the wasps: this was simply a common wooden box (procured from a grocer's), at the back of which I had a small hole cut, so that the wasps might have free exit and entrance: in place of cover of the box, I substituted a cover of glass, which could draw in and out, so that food could be placed inside when required. Two or three pieces of thin brass wire were placed across the length and breadth of the box: the whole was made firm by nailing it in an upright position to a wooden stand, under a tree, in a meadow some little way from the house. It was protected from the weather by some hurdles, arranged at a little height from the box, in the form of a gable, and covered with straw. The box being ready, the next question was how was the nest to be taken without injury to the taker or the taken? I had read some time ago in the Mem. of Professor Henslow, that he himself had invented a way of taking wasps' nests: it was described by him in the *Gardeners' Chronicle* for 1842. The method consists of simply "pouring about half a cupful of spirits of turpentine into and about the entrance-holes, after dark, when the wasps, with the exception, perhaps, of a few stragglers, are all in for the night: then place a flower-pan over it, and bank it round with earth." This has the effect of stupefying them; and if desired, the nest may be dug up thirty-six hours afterwards with perfect security. This plan, so simple and easy to put into practice, I determined to adopt; but I fancy, in giving thirty-six hours before the nest was to be dug up, Professor Henslow could have only thought of preserving the *nest*, and of the safety from stings of the person employed in taking it, and not of preserving the *insects* alive.

My first experiment was carried on under my own directions; but after fifteen hours, on digging for the nest, we found all the wasps in a state past recovery. I then thought a less quantity of turpentine and fewer hours might be attended with success. I fortunately heard of a very large nest, and easy of access, and accordingly the experiment was repeated. The nest had the same quantity of turpentine poured in and round the entrance-holes, and the other directions were followed with regard to the flower-pan and banking up; but instead of waiting fifteen hours, in two hours' time our gardener and coachman ventured to dig for it, and brought it to me under a large bell-glass just two hours and a half after the turpentine had been poured in. The wasps were then fast recovering from their stupor, but the servants had dug up the nest without the slightest inconvenience to themselves. Two or three drops of chloroform dropped on wadding under the bell-glass soon intoxicated the wasps sufficiently to allow me to remove them one by one with a pair of forceps into the box prepared for them. The nest I deprived of its cover and strong pieces of the comb, containing the grubs, at the bottom of the wire bars. As all this had to be done late at night, the box and its contents were placed in an out-house for the night; the door of the box was stuffed quite tightly with paper, several small holes to admit air having been bored at the top of the box. The next morning the men found the house full of wasps, having eaten away a good deal of the paper, and they had already begun to cover the wire bars with a thin layer of paper. The wasps were most amicable, allowing the box to be carried down to the meadow, and following it, but making no attempt to sting the person who carried it. They further allowed the box to be firmly nailed on to the stand, and quite established their claim in my eyes to being highly good-natured, by allowing me to open the glass front sufficiently to allow of my putting my hands in, and inserting an extra brass bar across the box without attempting to sting me, though they were working all the time, and one or two crawled on my hand, which was gloveless. I doubt whether bees would allow such interference. The wasps built steadily, covering over the grubs. The queen wasp kept in sight for the first two days, and seemed busily employed looking after the grubs; but as soon as the comb was covered, I saw her no more. The wasps in the space of ten days built a small nest. I did not begin my experiments until the middle of August; so the wasps had not so good a chance. I got another nest in the way already described, and with the same success in taking it, but the weather became colder, and the wasps did not finish any nest. I never got stung by them except once, when a wasp

crawled up my neck and got entangled in my hair; this I put down entirely to its not being able to extricate itself, for they frequently alighted on my hand and wrist without attempting to sting. I fed them daily with beer and sugar mixed together, and put outside their box. A stray hornet came daily to feed with them, but I never saw it interfere with the wasps at all. I saw it in the midst of some dozen wasps feeding; but when a large drone fly attempted to share the repast, the hornet flew at it, and carried it off bodily.

With regard to stings, I may mention that equal parts of common salt and sweet oil will allay all irritation and swelling. One great preventive against such a catastrophe is to be very quiet in your dealings with wasps; any flurry or bustle when you have to handle or feed them excites them greatly, and they would be then very likely to sting. I watched them for weeks, and found them most interesting pets, and hope to continue my experiments this summer. X.

WURALI.

THIS celebrated poison, also known as Urari and Curare, which was first published to the world by Waterton in the account of his travels, is believed to be the product of more than one plant, the principal ingredient being the juice of *Strychnos toxifera*, a tree of some rarity even in its own country, Central America. The indefatigable traveller Humboldt never saw the tree itself, only dried branches. Sir R. Schomburgk, the discoverer, or rediscoverer, of the Victoria regia, who spent seven years in traversing Guiana from end to end, saw the living plant, but neither flower nor fruit. Mr. C. Wallis was the first who had it in his power to give an exact description of this remarkable climber from personal observation; but it cost him no little trouble to find out the habitat of the solitary plant he was able to examine, so rare is it, and so jealously guarded by the Indians, to whom the life-destroying juice is as valuable as gunpowder to a European hunter. This single tree was the only source from whence the precious poison could be obtained within a compass of many miles; it was therefore prepared by the natives residing in the neighbourhood, and bartered by them among the more distant tribes.

Wallis, who did not himself see the poison prepared, tells us that the Indians boil down the expressed juice, not, however, in its pure form, but, as stated by other travellers, mingled with the sap of *Lasiostoma cirrhosum*, *Paullinia cururu*, *Piper geniculatum*, &c. According to Humboldt, the venom of serpents is not unfrequently added to make the mixture "thick and slab." As soon as it has reached the consistency of syrup, and before it cools, it is poured into small clay vessels, or calabashes, made from the fruit of *Crescentia cujete*. When wanted for use, it is moistened with warm water, and smeared on the heads of arrows, which are blown with wonderful accuracy through tubes, often sixteen feet in length, each tube being a single "internode," or space between two joints in a noble reed, named *Arundinaria Schomburgkii*. So deadly are the effects of the wurali that the stricken animal dies almost immediately, though, singularly enough, the juice of the plant in its fresh state may be applied to the body with impunity. Wallis several times squeezed the juice from the bark, wood, and even seeds of *Strychnos toxifera*, without experiencing any ill effects; from which it may be inferred that the poisonous property resides in the root, as is the case with more than one of the "veneniferous" plants.

This frightful poison has an alkaloid base known among chemists as Curarine, which, however, is believed to be identical with, or to approach very near to, strychine, of whose fatal powers when taken internally we have had several lamentable instances of late years in this country.

Humboldt tells us that the Otomaki, or earth-eating Indians, of the Orinoco, make a strange use of the Wurali, or Maracuri, as they call it, in their warfare. Their great object in battle is to close with their enemy, and woe to the unhappy wretch who encounters the embrace of an Otomak! The crafty warrior has anointed his thumb-nails with the deadly wurali, and, thus armed, uses every effort to tear the skin of his opponent: should he succeed,—and the slightest scratch is sufficient,—victory is insured to him, and a sudden and cruel death to his baffled enemy.

W. W. SPICER.

THE GREEN LIZARD (*Lacerta viridis*).—An individual of this species, originally purchased at Covent Garden, escaped from my Wardian case in June, 1867. One day last week I recovered the little tenant, nearly two years having elapsed from the time of its escape. Odd enough, I myself made the capture, but only about two hundred yards from my house, in a sandy bank, close to a road leading to a great railway station. It was a warm sunny day, and my attention was attracted to the spot by several passers-by, who had been arrested in their way to and from the station by the beautiful creature appearing at the mouth of the holes which it had excavated in the bank to a considerable length and depth, and where, at one place, was a kind of nest formed by a large quantity of bits of dry grass. With a spade I dug the lizard out, and re-obtained it in more than its original brilliancy, and very plump. It appears then that the species can well survive our milder winters, but I think that Dr. Martin endeavoured to naturalize them in the Isle of Wight without success.—*R. G., North Staffordshire.*

PREHENSILE ANTENNÆ OF THE ENTOMOSTRACA.

By Major Holland, R.M.L.I.

In Science-Gossip for July, 1865, we have an illustrated paper on *Cyclops quadricornis*: in the July number for 1866 we get one on the *Daphniadæ*, profusely illustrated; and the October number of 1868 gives us an interesting sketch of the heart of *D. Pulex*. These collectively contain so much information concerning the several families of this subdivision of the *Crustacea*, that one has to be careful to avoid repetition.

In the summer every ditch and pool supplies us with water-fleas in myriads; and even the dwellers in large cities, who never wander "by meadow, lake, and stream," but love the fair face of Nature none the less, because the exigences of stern duty shut it off from them, may enjoy an hour's fishing with a pipette in their water-jugs with good sport if their main comes from the reservoir of an old-established company; in Devonshire I could always make sure of three varieties of *Daphnia* in the *carafe* in my dressing-room. Like many other very common things, they are very beautiful and very wonderful: perhaps nothing sends the embryo microscopist into such a fever of enthusiasm as the first good view of one of these tiny creatures, with throbbing heart, moving eyes, palpitating flanks, and nacreous reticulated shell flashing rainbow hues, as it gasps and struggles in the small drop of liquid on the slide. Like all other animals, they present us with evidences of design, showing us special adaptations of certain parts or organs—the enlargement of this, the modification of that, to meet some new requirement of the creature's life-conditions, or the non-development beyond a rudiment, or total suppression of some element of the original type of the order, which would have been superfluous, perhaps harmful to the being, in the particular province allotted to it.

In the *Daphniadæ* the first pair of feet of the male differ considerably from the corresponding limbs of the female, being furnished in the former with a strong claw or hook attached to the extremity of the second joint, which enables them to seize and hold fast any object; and it seems that the gentleman Daphnia would not be able to get on at all without this arrangement; for the lady Daphnia is a coquette. "Sighing and singing of midnight strains" won't do for her; "deeds not words" is her maxim; respectful admiration from a distance is all very well for some people, but she will never requite a passion so coolly controlled; she prefers audacity; at first she affects alarm mingled with indignation, and leads her inamorato a fine dance if he is silly enough to allow himself to be discouraged by her seeming reluctance; she demands a judicious amount of rightly-timed gentle violence, and when her suitor, in a moment of happy inspiration, boldly seizes her hand, or, to be more precise, catches her first pair of feet with the armed first pair he is furnished with for the purpose, she ceases to say nay, and welcomes his wooings with the warmest sympathy.

But coquetry is not confined to fresh water; there is flirting in the briny ocean, and the love-chase goes on swimmingly even in brackish rivers and estuaries; everywhere living things dance to the good old tune of "*C'est l'amour, l'amour, l'amour.*" In salt, or half salt and half fresh cruising-grounds, the gallant knights of *Diaptomus Castor*, of *Anomalocera*, and other distinguished orders, who would be Benedicts, must chase and catch their fast-dashing brides like the wild Tartars of the Steppes; and as to the old love game of "catch me, kiss me," there is added "and keep me *if you can.*" They are provided (instead of armed feet) with hinge-jointed antennæ, with which when they have caught they can hold fast the aggravating damsels.

The fair *Cyclopidæ* must be superlatively flighty, they literally require to be assailed right and left, and Nature, like a good kind mother, ever meeting the need of her children, and determined never to spoil sport, has provided their cavaliers with hinge-joints in *both* of their antennæ; though one such weapon is found to meet the requirements of most genera. This enlargement in the right or in both antennæ renders the male distinguishable at a glance. The ocean swarms with these curious *Branchiopoda*, whose cast-off cases and exuviæ form no inconsiderable portion of the muddy ooze of the deep-sea beds. Somebody mentions that he has seen a Daphnia moult no fewer than eight times in seventeen days: what a heap of "old clo" there must be to be worked up into new fabrics of some sort, out of the exploded suits of Entomostracans alone.

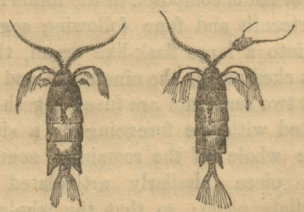


Fig. 92. Female of *Labidocera magna*, nat. size.
Fig. 93. Male of *Labidocera magna*, nat. size.

Here we have a pair of Pelagic Entomostracans taken by the towing-net in the South-west Pacific. I can find no record of the capture of this species on our own coasts, but I suspect that it is to be found in the waters of the warm current that tempers the climate of our western shores. The

species owes its name to the conformation of the right antenna of the male—*Labidocera*, from λαβις, *forceps*, and κερας, *a horn*—with the Latin adjective *magna*, in virtue of its great size. These are a species of the genus *Calanus*, of the order *Lophyropoda*. When fully developed, each antenna in either sex consists of twenty-five segments; of these the first thirteen present nothing remarkable, but all the remaining segments in the right antenna of the male enter into the composition of the remarkable prehensile organ depicted below.

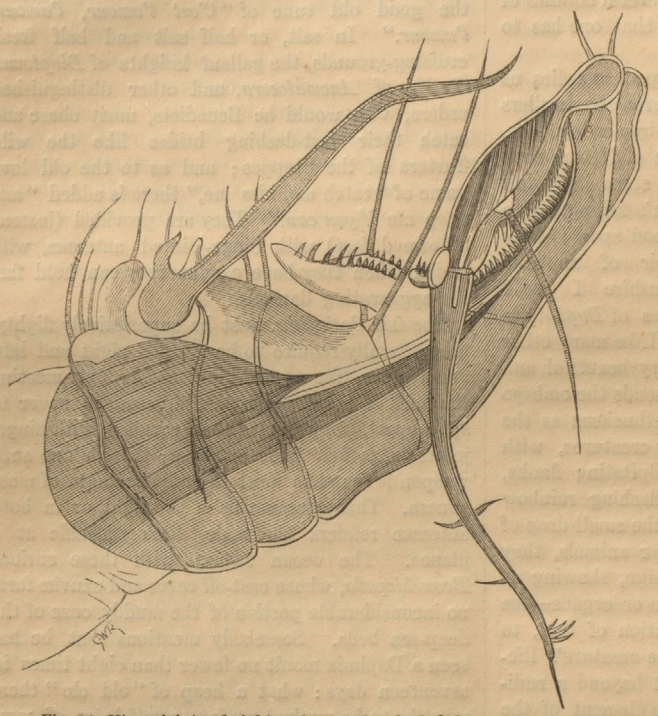


Fig. 94. Hinge-joints of right antenna of male *Labidocera magna*, × 250.

"This organ is composed in the following manner: the fourteenth and four following segments are dilated into a large flask-like organ, the neck of which is eked out by the nineteenth and twentieth; the next two segments are fused together, and are articulated with the foregoing by a simple joint, and the whole of the remaining segments form another piece similarly articulated with the intermediate piece; so that the whole results in two simple joints, susceptible of flexion in one direction only. Two processes of the same nature, but differently placed, and more elongated, lie side by side upon the fore part of the first compound segment. This piece and that which succeeds it act upon each other like a pair of jaws, each furnished with an array of sharp conical teeth, while the last compound member of the series plays over the upper surface of the eighteenth segment." (Dr. McDonald, F.R.S., in *Mag. Nat. Hist.*, 1853.)

The fifth pair of legs also differ in the sexes, the right leg of the fifth pair of the male forming a powerful prehensile apparatus.

These formidable instruments look more like engines of war from the armoury of Mars, than snares and lures from the repository of Cupid. They certainly meet with very hard knocks somewhere, for in innumerable specimens subjected to the microscope, the grappling antennæ were found broken at the hinge, the two terminal articulations having been torn off, whether in mortal combat with a rival knight jousting *à l'outrance* for possession of the queen of beauty, or by the indignant struggles of some surpassingly chaste Vestal of the Deep, I cannot determine.

It has been my fate to speak of the universal distribution of parasites, in a previous number. "The intestinal canal of animals," says Leidy, "is most frequently infested by entoparasites on account of the ease with which their germs enter into the food. Aquatic animals are more troubled by Entozoa than those which are terrestrial, because the water affords a better medium of access than the air;" and our *Labidocera* forms no exception to this rule. Having opened his thorax for the purpose of examining his internal economy under the microscope, a low power detected a tiny object apparently on the move: the quarter-inch and B eyepiece showed it to be an Entozoon, wholly unlike anything I have ever seen or heard of anywhere.

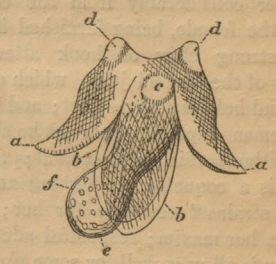


Fig. 95. Entozoon from the thorax of *Labidocera magna*, × 450.

The body (*e*), which is here shown swinging away to the left, is sack-like and cylindrical, having somewhat the appearance of a bladder slightly

constricted in the middle, and, like the bodies of the *Cystici* and *Cestodes*, exhibits a number of hard corpuscles dotted about immediately beneath the skin, which in these two orders Siebold tells us "contain carbonate of lime, and may be regarded as the vestige of a cutaneous skeleton." The larger spheroidal bodies (*f*) seen through the integument are ova, which (to make sure) were extracted and examined; but I do not think it worth while to dilate upon them here. Below the large circular mouth (*c*), with its encircling armature of hooklets, a kind of cloak envelops the anterior portion of the body, being slit up just below the shoulders into four wing-like transparent lappets (*a a*, *b b*) hanging free, by means of which progression is effected.

It climbs the cylinder of the alimentary canal precisely in the same manner as in the good old times, before Act 5 Vic., 1840, the poor little sweep "shinned up" the grimy flue of a narrow chimney. In the above figure we see the two side lappets (*a*) contracted, with their apices (*d*) forced up above the head, or oral orifice (*c*), and their free limbs extended outwards with a curve, so as to press against the walls of the digestive tube: just as the young sooterkin elevated his shoulders to the top of his ears, then drew up his elbows square with his shoulders, and having "got a bearing" by digging with his "funny-bones" against the hard rough bricks, swung himself off his feet and drew his body up by the downward pressure of his arms, stretching up his neck the while, and so arrived at the end of the first stage of his first step in the ascent; so also, by a very similar set of evolutions has his oceanic analogue, the Labidoceran "flue-faker," accomplished the like feat, as shown below.

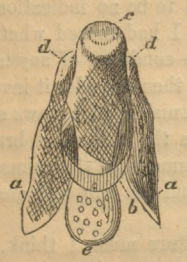


Fig. 96. Second position in climbing.

And as the boy, after he had swayed up his body by the downward pressure of his arms, next proceeded to draw up both legs and to "get a set" with his knees as he had previously done with his elbows, so we observe that our Entomostracan parasite having reached up with its neck, is drawing up its second pair of lappets (*b*) to push itself upwards by their downward thrust, and thereby finish the second stage.

In addition to the mouth proper (*c*), which is well shown in this last cut, there appears to be a suctorial disc (*d*) on the apex of each lappet, used as an auxiliary in climbing, for holding on with between the lifts, and probably supplementing the anchoring hooklets of the head, if not constituting the main mooring apparatus by which the creature secures itself in the new resting-place it has reached.

Bury Cross, Gosport.

ODD NOTIONS.

THE collector of objects for a fresh-water aquarium must often be struck with the marvellous notions that prevail among rustics about many of the commonest inhabitants of our ponds and rivers: there really appears to be no rubbish too extravagant for country people to believe, and it is often no easy matter to undermine their convictions. A few days ago, being in want of some newts—I am at present studying the habits of these interesting creatures—I adjourned to a neighbouring pond, and was settling down to my work, when a farm labourer, who was strolling about the meadows, came loitering up. He watched me intently for some minutes, and then, having probably made up his mind that I must be trying to catch my breakfast, and pitying my choice of a locality, he addressed me, "This doant look a very loikly place for *fish*, do it?" I replied by showing him my captures, some ten or twelve newts, and, explaining that *these* were the objects of my search, asked him if he did not admire their beauty. "Oh," he cried, with the oddest mixture of surprise and terror in his countenance, "what *are* you agoing to do with *them?* they tell me these ere varmint spit *fearful pisen*." Nothing that I could say to persuade him otherwise was of the least avail; the power of *Triton cristatus* to discharge venom was evidently far too important an article of his creed to be removed so hastily, and he departed under the unshaken conviction that I had enough there in my can to poison the whole neighbourhood. Another time I was actually earnestly advised by a man whom I met to throw some beetles, I was carrying, back into the canal. He seemed to have a vague idea that these unfortunate creatures were intimately connected with sundry witcheries that he had heard of, though in what particular way the powers of darkness had managed to form a league with water-boatmen he was unable to explain. Of course I declined to accept his advice, and, evidently hurt at my obstinacy and unbelief, he left me with a final and solemn exhortation: "Look here," he said, "*I* knows more about them things than *most*, and *I can tell you this—they never does nobody no good*."

EDWARD BANKS.

Tettenhall, near Wolverhampton.

THE CROWN ANIMALCULE.

I HAVE been very much interested in reading Mr. W. H. Hall's remarks upon *Stephanoceros Eichhornii* and its allies, and the more so as my experience very much corresponds with his. Some years ago, I kept an aquarium well stocked with fine-leaved water-weeds and a few minnows, chiefly as an adjunct to the microscope. As a rule, it swarmed with Stentors; but I found, in addition to these, many species of rotifera, vorticellids, and other animalcules. In the summer of, I think, 1862, in looking casually over a bit of conferva, I found what I had long looked for in vain,—a specimen of the Crown Animalcule. My pleasure in making the discovery was, perhaps, equal to your correspondent's. An occasional dip into the tank rewarded me with other specimens, and I soon found that to catch them was no haphazard matter, for they were clearly perceptible to the naked eye through the plate glass sides, even though situated in the remotest corner. The majority of the specimens (although that depended very much upon their age) were extremely fine. Some were so large as to be visible—if favourably situated with regard to the light—without artificial aid, at a distance of two feet. I saw them covering the stems and leaves of plants, as well as the sides of the aquarium, in hundreds. To the eye each Stephanoceros looked like a particle of jelly depending from the object to which it was attached, and swayed to and fro with every current. Even the crown, the creature's chief ornament, was visible, like a delicate film, protruding from the apex of the gelatinous envelope. I did not notice the formation of statoblasts. If there were these at any time, they escaped observation. The Stephanoceri, however, were prolific. Young were rapidly hatched, and, in at least one instance, I observed the escape from the parent of an infant Stephanoceros, as described by Mr. Gosse (*Popular Science Review*, vol. i. p. 39). They increased and multiplied throughout the winter, and at no time, so long as I kept the aquarium together (some two or three years), were they altogether absent from it. Although very many specimens of the Floscule tribe, including *Floscularia ornata*, *F. campanulata*, and *F. cornuta*, were found, as well as *Melicerta ringens*, there was nothing like a "struggle for existence." There is nothing in the nature of these creatures, so far as I can see, leading to the conclusion that one species is forced out of existence, or supplanted, by another. If it does happen that one species is eclipsed by another, in point of numbers, in any season, the circumstance, I apprehend, is merely accidental. Nor do I think that the food supplied to the fishes had any bearing upon the development, as regards size, of individual Stephanoceri. What I consider of more importance is the aspect of the window in which the aquarium is situated. Mine had a north-eastern aspect, and therefore got very little sun. Rotifera cannot exist if exposed to the burning rays of the sun, in a glass vessel, as they would be if placed in a window with a southern aspect. Nor is such a situation favourable to any kind of animal or plant life in an aquarium. I therefore attribute the failure of any attempt to stock aquaria with tube-dwelling rotifers more to the improper situation of the vessel than to the fact of their being introduced in the fully-developed form. The disappearance of a certain species of animalcule, which may for a time have been abundant, is to me quite unaccountable. It is, nevertheless, a fact that they do disappear. Stentors seem particularly liable to these mutations. One winter my aquarium was literally overloaded with Water-bears; but on the approach of spring they gradually died off, and I have never seen one since. J. C.

16, *Ellesmere Place, Stockport Road, Manchester.*

CURIOUS ANIMAL FROM SALT LAKE.

THE following is the reply of P. H. Gosse, Esq., F.R.S., to the letter published in SCIENCE-GOSSIP for April, p. 79:—

Sandhurst, Torquay, Feb. 17, 1869.

MY DEAR SIR,

I am very much obliged by your courtesy in sending me the duplicate sketch of your strange animal from the Salt Lake, and the fuller particulars of its known history. I wish I could give you any information of value regarding it; but I am utterly at a loss to what place in the *Systema Naturæ* to refer it.

There appears to be no indication of a vertebral column; or else I had mused whether it were the larval or tadpole condition of any unknown Batrachian. We may then consider it invertebrate. The pairs of limbs furnished with claws seem to exclude *Mollusca*, as does the absence of branchia or lungs. The bilateral symmetry of the animal eliminates the Radiate forms, and the Protozoa are manifestly out of the question.

Thus the creature must, I think, be referred to the great division Annulosa; but to which of its classes? The size, the absence of a mastax, of rotatory cilia, the number and position of the limbs, exclude the Rotifera. The form of the body, of the limbs, of the respiratory vessels, exclude the Annelida. Myriapoda and Arachnida need not be considered. There remain Crustacea and Insecta, and to these I suspect it will prove to belong. Yet everything suggests that not the perfected, but the larval condition is thus presented. The absence of segments in the body, and of joints in the legs, is against its being a fully-developed form of Arthro-

poda. The lack of branchia is against its belonging to Crustacea; while if those long tortuous canals are indeed respiratory (as you call them), they look more like the tracheal apparatus of Insecta. But then the limbs—no insect has more than six; no crustacean more than fourteen; but here are sixteen. The structure which you describe in these organs reminds one much of the organs called prolegs in most of the Lepidopterous larvæ, especially in the circle of little hooks surrounding the extremity; but this analogy is belied by everything else in the creature. The anal (or cloacal) orifice, situated just where it would be in a lizard, with a long-developed tail behind it, is totally unlike anything I know in the Annulose classes.

Altogether the creature is most puzzling. I incline to think it is a larval or immature state of some animal in this great division; but I cannot conjecture what are its affinities. As you intend getting more specimens, if possible, I recommend that you (or if transmission alive so far is out of the question, some one at the spot) should endeavour to keep them alive in the native water till either the transformation occur, or it be disproved.

Of course all that I have said above rests on the traced sketch. Possibly if I saw a specimen I could speak more positively; at all events, certain points could be tested on which there is at present no evidence.

The occurrence of an Artemia in the Salt Lake is very interesting: are you quite sure the species is identical with our *A. salina?* There is another species found in Algeria,—*A. Oudnayi.*

Believe me, &c.,

P. H. GOSSE, F.R.S.

S. A. BRIGGS, Esq.,
Chicago.

FRESH-WATER POLYZOA.

THE writer of the article on "The Wheel Animalcule" in the May number refers to "the statement of a correspondent, in the 'Annals of Natural History,' to the effect that he never failed to stock his aquarium with fresh-water polyzoa, if he obtained for that purpose the statoblasts on some fine winter's day or early in the spring, but could not succeed with the mature animals."

I have had no difficulty in stocking with the mature animals in case of *Plumatella repens*, which, in May last year, I took from a pond at Tipton, and placed in my aquarium. They were attached to stones in considerable numbers. They continued in perfect health during the whole of the summer and autumn, but as winter approached their plumes gradually disappeared, until at last only dead cells remained. The pond was visited from time to time, and the same changes took place there. The upper surfaces of the dead cells in the tank soon decayed, exposing statoblasts *attached* to the stones, in evidently the same position they occupied before the death of the parent form.

On the surface of the water of the tank also statoblasts were abundant; these are what Professor Allman designates the ordinary statoblasts, which lie loose in the cell, and ultimately become *free*. He describes the *attached* statoblasts as follows:—they "never lie loose in the cell, but are invariably attached to the internal surface of the walls, to which they adhere by means of a peculiar cement.... After the decay of the cœnœcium, many of these attached statoblasts may be seen adherent to the stone or other object on which the specimen had developed itself, and to which they are now connected in lines through the medium of a portion of the old cell in which they had been produced. I am unable to state whether the origin and destination of the last described bodies is similar to that of the others, and I have not succeeded in witnessing the escape from them of the young." (Monograph Fresh-water Polyzoa, Ray Soc.)

I have just been so fortunate as to observe the escape of the young from the attached statoblast. In March last I detached from one of the stones in the tank before mentioned a fragment, upon which were two of the adherent statoblasts, and placed it in a zoophyte trough. These were watched daily, and in about three weeks I was delighted to witness the budding forth of a young polyzoon from one of them. When first observed its tentacles drooped, as if they had not yet been expanded, but soon the entire crown was in full activity. I was able to count twenty-four tentacles. It continued attached to its native spot with the valves of the statoblast adhering to its body, "the admiration of all beholders," for about a week, when it was accidentally killed.

This directed more watchful attention to the tank, and the pool was again visited. Many of the statoblasts on the stones in the tank were just showing a white tip through the opening valves, and in a few days, by 24th April, several were fully developed; these also, like that in the zoophyte trough, occupied the position of the statoblasts, with one or both valves adhering to the body of the polyzoon. Some brought from the pond, about the same time, exhibited the same changes, and are now flourishing side by side with the natives of the tank.

CHARLES KETLEY.
Smethwick.

BRITISH ASSOCIATION.—The meeting for this year will be held at Exeter under the Presidency of Professor Stokes, of Cambridge. The opening day will be Wednesday, the 18th of August next. Great preparations are being made at Exeter to give the Association welcome.

CLOVE-PINK SEEDS.

REFERRING to the seeds of two species of *Eschscholtzia* (p. 12), we ventured an observation which has not pleased one of our readers, perhaps more. It was to the effect that there appeared to be a certain type of structure which was common to the seeds of closely allied plants, especially in those of the same genus, often in those of allied genera. The examination of the seeds of some hundreds of plants led to this conclusion, which we still see no reason to alter. So evident is this in the Clove-pink family, or *Caryophyllaceæ*, that we can hardly detect any describable difference, in many instances, between the seeds of plants belonging to the same genus. It is, nevertheless, true that exceptions exist, but these are not sufficient to affect the general conclusion that closely allied seeds usually follow the same type, with modifications in details. The prevailing type in seeds belonging to the genera *Silene*, *Viscaria*, *Lychnis*, *Saponaria*, *Agrostemma*, *Gypsophila*, and *Stellaria* is clearly that of a reniform, or kidney-shaped appearance, with a more or less warty exterior. Yet there is sufficient variety to make

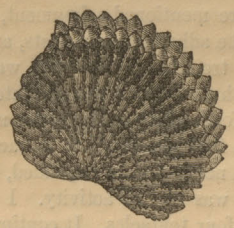


Fig. 97. Seed of *Silene Armeria*, × 40.

them all of interest to the student of microscopical seeds. We by no means deny that in the same natural order, as in the *Scrophulariaceæ*, there are many very different types of structure, and even in the Clove-pink order the *Dianthus* type is very different from the *Stellaria* type. Yet, if the sceptic

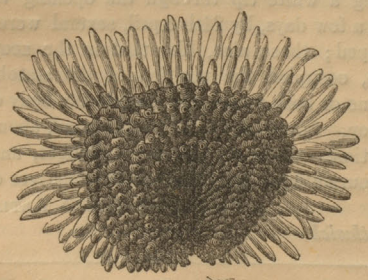


Fig. 98. The seed of *Silene alpestris*, × 40.

will compare the seeds of *Silene Armeria* with those of the *Silene Schafta*—and of *Gypsophila muralis* with *Gypsophila elegans*, and these, again, with *Viscaria oculata* and *Viscaria splendens*, he will not fail to recognize a family physiognomy such as we contend for.

The order of plants from which our examples are taken is a very large one, and, although numerous in British species, the seeds of these and many other indigenous plants seem to be the least known.



Fig. 99. Seed of *Viscaria oculata*, × 40.

Lobel's Catchfly (*Silene Armeria*) is a common and favourite garden-flower (fig. 97), and the seeds of the Bladder Campion (*Silene inflata*) and the garden annual *Silene Schafta* very greatly resemble those of the Catchfly.

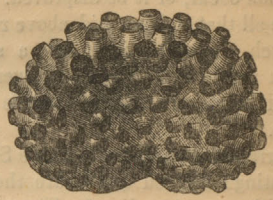


Fig. 100. Seed of *Stellaria holostea*, × 40.

The seed of *Silene alpestris* (fig. 98), while possessing in its fundamental structure a close affinity to others of the genus, has in addition a winged margin, which confers additional beauty upon it as a microscopical object, without forfeiting its family likeness.

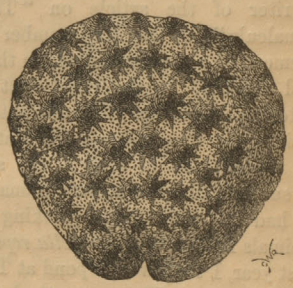


Fig. 101. Seed of *Stellaria media*, × 40.

None of the Viscarias are British, but several species are in common cultivation, and those of *Viscaria oculata* are figured (fig. 99).

The Stellarias are numerous, and we present figures of two, the "Stitchwort," or Satin-flower

(*Stellaria holostea*, fig. 100), and the Chickweed (*Stellaria media*, fig. 101). Perhaps "E. M." can show us a different type of structure in the seeds of *Stellaria graminea*, *Stellaria glauca*, *Stellaria nemorum*, and *Stellaria uliginosa*, and confute us at once.

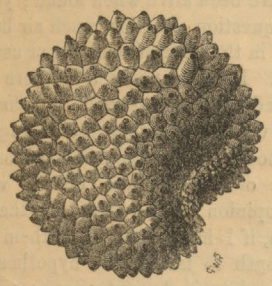


Fig. 102. Seed of *Saponaria Calabrica*, × 40.

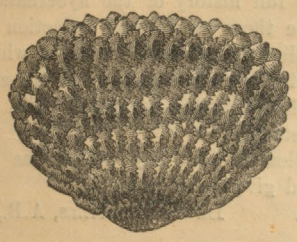


Fig. 103. Seed of *Agrostemma coronaria*, × 40.

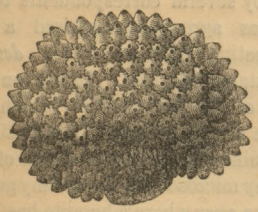


Fig. 104. Seed of *Lychnis dioica*, × 40.

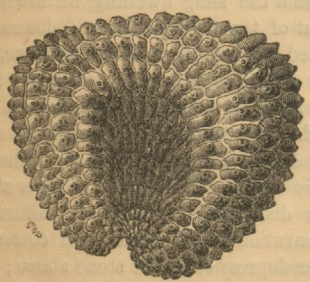


Fig. 105. Seed of *Gypsophila elegans*.

The remaining seeds of which we have presented figures are a species of Soapwort (*Saponaria Calabrica*), a common garden-flower (fig. 102); a "Cockle" (*Agrostemma coronaria*, fig. 103); the red Lychnis (fig. 104); and *Gypsophila elegans* (fig. 105), all more or less of the Stellaria type.

The two remaining seeds of the Indian Pink (*Dianthus sinensis*, fig. 106) and Sweet William (*Dianthus barbatus*, fig. 107) are unfortunately not drawn to a uniform scale, but the similarity of type

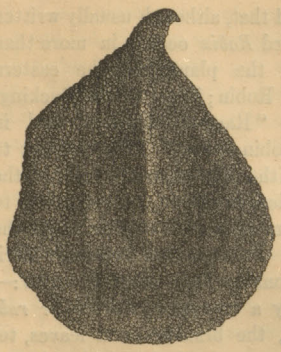


Fig. 106.
Seed of *Dianthus sinensis*, × 40.

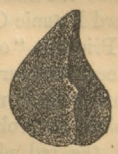


Fig. 107.
Seed of *Dianthus barbatus*, × 20.

between the two is as apparent as their difference from the rest. If any one would carefully collect the seeds of all the British species of *Cerastium* and *Arenaria* during the coming summer, we should be happy to share with them.

"HERB ROBERT."

IT may perhaps be interesting to enumerate the various origins which have been suggested for this name, generally applied in books to the common *Geranium Robertianum*, as an illustration of the difficulty of positively determining even so apparently trivial a subject. Some suppose the plant to have been dedicated to St. Robert, a Benedictine abbot of the twelfth century, who is commemorated on April 29, when *G. Robertianum* is in flower. Dr. Prior says the name is "from being used to cure a disease, called in Germany *Ruprechts-plage*, very probably in allusion to Robert, Duke of Normandy, for whom the celebrated medical work of the middle ages, the *Ortus Sanitatis*, was written." A writer in *Notes and Queries* (Series I. ii. 322) is disposed to think that the plant was formerly in some way associated with Robin Goodfellow; and the following passage from M. Edouard le Héricher's "Essai sur la Flore Populaire de Normandie et d'Angleterre," while suggesting a different origin, favours this idea. "Who is this Robert? May there not be here a *souvenir* of that historical or fictitious personage, Robert the Devil, popular in Normandy, as representing perhaps the exaggerated type of Norman? What would induce us to suppose this is, that it is sometimes called Devil's Herb (*Herbe au Diable*); it has the property of misleading the traveller who walks upon it under certain circumstances, and of *preventing him from finding his way*." Surely here we have attributed

to the plant one of the vagaries of Puck, whose delight it is to

"*Mislead night wanderers*, laughing at their harm."
Midsummer Night's Dream.

It may be observed that, although usually written Herb *Robert*, the word *Robin* occurs in more than one local name of the plant; in the eastern counties it is "Red Robin;" one of its Buckinghamshire names is "Ragged Robin;" and in Devonshire it is "Robin-flower." The attempt to connect the name with a Professor Roberts, of the Oxford Botanic Garden, is absurd, as, according to Dr. Prior, it "occurs in a MS. vocabulary of the thirteenth century." Perhaps Mr. Grindon's derivation is more reasonable than any; he writes:—"Robert is probably a corruption of *rob*, or *rub-wort*, the red plant, the branches and leaves, towards autumn, being remarkable for vivid redness: herb would subsequently be prefixed, when the original idea was lost in that of a fancied dedication." (*British and Garden Botany*, p. 119.) This notion is somewhat borne out by the fact that Sir John Hill, in his "Herbal" (1789), refers to its redness as a prominent feature. "It is to be observed," says he, "that Nature seems to have set her stamp upon several herbs which have the virtue to stop bleeding; this and the Tutsan, the two best remedies the fields afford for outward and inward bleedings, become all over as red as blood at a certain season." This idea of Nature having "set her stamp upon several herbs" originated what is called "the doctrine of signatures." I have lately seen *G. Robertianum* called "the *Robert-leaved* Cranesbill," but am at a loss to discover the meaning of the prefix. JAMES BRITTEN.

High Wycombe.

HYBERNATION OF THE HUMBLE BEE.

IN answer to the questions of Mr. Hall, in reference to my paper on the "Winter Home of the Humble Bee," I wish to state that the facts which I have given in my papers are strictly true, and that the engraved illustration is an elegant and faithful representation of the drawing which I sent to the publisher of SCIENCE-GOSSIP. The friend to whom I referred in my paper is Samuel Brown, LL.D., formerly of Armagh, now of Parsonstown—a distinguished scholar, a naturalist, and a microscopist. As to the interpretation of the facts, I may say I did not mean to convey the impression that "no passage to the cell ever existed," as one of the questions of Mr. Hall would seem to imply; I merely stated the fact that neither Dr. Brown nor I could discern any marks of the passage by which the bee had found access to its place. If I had given any opinion as to the mode of access, I should have said that in all probability the bee had burrowed a passage to the cell, and that as she advanced she filled up the passage behind with the earth removed from the front, the earth from the cell filling up the inner and last portion of the passage.

Neither did I mean to give any suggestion to the idea that "all air was excluded;" some air must certainly have found access to the cell, or the bee could not have been alive when found; yet it is an interesting question whether much air be required for an insect in the state of semi-torpor usual during hybernation. I should think that there is not so much required as is necessary during the period of activity and vigour. Whether late in August be not in general too early for the commencement of the hybernation of the humble bee I would not express an opinion further than this, that the facts I have given, if I have interpreted them correctly, go some length to favour the hypothesis that in *some instances* late in August may be a usual time for such commencement.

For the full history of the hybernation of the humble bee there must be an induction from the facts supplied by numerous cases, of which I can only hope to have afforded, through the medium of SCIENCE-GOSSIP, those connected with a single reliable instance.

I am pleased that my paper has provoked inquiry and given some interest.

Armagh. LEWIS G. MILLS, A.B., LL.B.

Interested as I have been in remarks made on this subject by several correspondents to SCIENCE-GOSSIP, I was agreeably surprised a few days since by meeting with an *ocular demonstration* of the facts stated by them. It was on one of the coldest days of the last week in March, when, in company with a young friend, I was busily ransacking the old ruins of a castle, in search of objects of interest for my microscope. It was my good fortune to turn a stone over where a humble bee had located itself during the winter. As soon as I had removed the roof from the snug dwelling, its lowly denizen shuffled out of the hollow in a half dormant state, and crawled awkwardly a short distance, halting every now and then as though to recover from the surprise which his sudden introduction to daylight had caused. After securing my new-made acquaintance in a bottle, I proceeded to examine his late abode. No architectural beauty, no aims at comfort were here displayed, beyond those afforded by a rough excavation in the chalky soil corresponding to a similar depression in the stone above; this was all, for after the closest scrutiny I felt perfectly satisfied that no aperture for entrance or exit could be discovered. The hollow was just sufficient to allow my humble friend to be curled up comfortably, and, as far as warmth goes, I feel sure he did not lack. Mr. Mills states in SCIENCE-GOSSIP for February that he discovered his bee late in August. If this be the time at which they take to their

winter residences, the bee (which I have now under my dissecting knives) must have spent seven months in its solitary home. This may afford some clue to the solution of the fourth question put by Mr. Hall. As to the objection of these being merely instances of involuntary imprisonment, I think the three cases now noticed are sufficient evidences to the contrary. Why should we be greatly surprised to find that the bee can hybernate so long deprived of air and food? Contrast its former existence with its present torpid state, *i.e.*, a continuous round of muscular activity, with perfect quiescence. The waste of tissue, consequent upon active exertion, bears to it, as we know, a constant ratio, and may be expressed by the amount of carbonic acid excreted (in the insect tube). Dr. Carpenter writes:—"A humble bee has been found to produce one-third of a cubic inch of carbonic acid in the course of a single hour, during which its whole body was in a state of continual agitation from the excitement consequent on its capture, and yet during the whole twenty-four hours of the succeeding day, which it passed in a state of comparative rest, the quantity of carbonic acid generated by it was absolutely less." What, then, must the waste of tissue be, during hybernation, but an infinitesimal amount? The definitive processes being thus so little required, respiration is naturally at a low point; yet, still, the nutritive functions, though reduced to a comparatively low scale, suffer little from imperfect aëration of the fluids.

W. BEVAN LEWIS, L.R.C.P. (Lond.)

PROTEUS ANGUINUS.

I HAVE had in my possession for the last thirteen months a living specimen of this most singular brute, of the peculiarities of which I would gladly give some account to the readers of SCIENCE-GOSSIP, but unfortunately it leads so secluded and monotonous an existence, that there is really very little to say about it. We all remember the ancient Joe Miller—of the young aspirant for diplomatic honours being called upon to give a *précis* of "the habits and manners" of some African nation, and of his gravely recording that "their habits were beastly, and as for manners, they had none." Now I must own, with regard to Proteus, that though his habits are particularly cleanly, his manners are by no means striking; they are, in fact, of rather a negative order. He never closes his eyes in sleep, for he has none to close; rarely moves about, and still more rarely eats; and never seems to be disturbed by any passions or feelings whatever. Moreover, as he is kept covered over by a thick cloth to prevent the light from penetrating and injuring his delicate system, it would be very difficult to make any observations, were there anything worth recording. A short description, however, may be of interest.

Proteus (or Hypocthon)* *anguinus*, the sole representative of its genus, is a Batrachian of the second, or "tailed" family, with a body of an eel-like appearance, about eight or nine inches in length, and of a pinkish, nearly white, hue. The head is long and flat, the legs very short, the anterior pair with three, the posterior pair with two, very weak toes. The animal breathes both by external gills and internal lungs, so that it is strictly an amphibian. The gills are not unlike those of the tadpole, on a larger scale, and far more transparent. It is easy to see from their colour, whether pale or blood-red, whether the animal is in a satisfactory condition; the latter being "the hue of health."

But the strangest part of its organization is the fact of its being entirely without any means of seeing. Living as it does in a subterranean lake deep in the Adelsberg caverns of Carinthia, it is plain that this strange reptile has no need of eyes. The organs of sight are, therefore, obsolete, but represented by two black specks, which, as the most superficial observation shows, are planted under the epiderm.† At the same time it is singular how quickly and intensely the animal is affected by the light. No sooner is the cover removed from its bowl than it tries hard to creep behind a stone, or in some way to shroud itself in its much-loved obscurity. Although, however, so carefully shunning the light, and in spite of its habitat being situated in an ice-cold lake, it is apparently by no means averse to warmth. There is a constant fire in the room in which it is kept; and if I chance to remove the cover of the bowl when the mid-day sun is shining on it, I have frequently noticed the animal with its head and body raised up and pressed against the side of its prison in the direction of the solar rays.

What it may live on in a wild state I know not (Professor Lennis says on mollusks), but it is well known that in captivity it rarely, if ever, touches anything. My Proteus has consumed two tadpoles since it came into my possession—it was brought me straight from Vienna. At least I placed them in the fish-bowl last May, and never were they seen again. They could not possibly have got out, and no remains were ever found, so I presume they were consumed by their near relative. He has never had the chance of eating any since, but his body looks as plump as so greyhound like a barrel well can.

The water, I may observe, has not been changed since last October; the less it is changed the better; it is perfectly sweet and clear.

Itchen Abbas. W. W. SPICER.

* Dr. Jos. Laurenti gave the name of "Proteus" just a century ago. But as it was ascertained (1820) that the animal, unlike most other members of its family, undergoes no transformations, the name appeared so pre-eminently absurd, that Dr. Bl. Merrem re-christened it "Hypocthon, the Subterranean."

† I have specimens in spirits of wine of fish and crustaceans from the great Kentucky caves, which are also eyeless.

ZOOLOGY.

HORNBILLS AT HOME.—I had sent my hunters to shoot, and while I was at breakfast they returned, bringing me a fine large male of the *Buceros bicornis*, which one of them assured me he had shot while feeding the female, which was shut up in a hole in a tree. I had often read of this curious habit, and immediately returned to the place, accompanied by several of the natives. After crossing a stream and a bog, we found a large tree leaning over some water, and on its lower side, at a height of about twenty feet, appeared a small hole, and what looked like a quantity of mud, which I was assured had been used in stopping up the large hole. After a while we heard the harsh cry of a bird inside, and could see the white extremity of its beak put out. I offered a rupee to any one who would go up and get out the bird with the egg or young one, but they all declared it was too difficult, and they were afraid to try. I therefore very reluctantly came away. In about an hour afterwards, much to my surprise, a tremendous, loud, hoarse screaming was heard, and the bird was brought me, together with a young one, which had been found in the hole. This was a most curious object, as large as a pigeon, but without a particle of plumage on any part of it. It was exceedingly plump and soft, and with a semi-transparent skin, so that it looked more like a bag of jelly, with head and feet stuck on, than like a real bird. The extraordinary habit of the male in plastering up the female with her egg, and feeding her during the whole time of incubation, and till the young one is fledged, is common to several of the large hornbills, and is one of those strange facts in natural history which are "stranger than fiction."—*Wallace's "Malay Archipelago."*

IMPORTED INSECTS.—The (by some persons) proposed reintroduction of extinct and resuscitation of waning species of native lepidoptera will not, I trust, be carried out. It appears to me that it would be both an unsatisfactory and also foolish proceeding. Unsatisfactory, because the capture of a rare insect (say *V. antiopa*) would be robbed of half its charm and delight were we once doubtful whence the specimen came. If we knew that Mr. Brown, of London, had been "turning out" *Antiopa* from imported pupæ, or that Mr. Jones, of the New Forest, or Mr. Robinson, of Brighton, had been doing the same, we should, on capture, never pin one of those insects into our cabinets with any real satisfaction, or be able to point to it as a British-caught specimen with any show of honesty. Foolish, because the disappearance or increasing rarity of certain species indicates a change in or withdrawal of those circumstances or conditions essential for their prolonged existence amongst our fields and woods; and, unless we can restore those conditions, to attempt to revive the species is simply to fight against nature. Let us keep our island soil safe against the intrusion of foreign "lepidops," as we would against foreign bayonets. Let us, say I, tramp our woods and wilds through a lifetime, and still at the end, may be, find our labels "unspecimened" (to coin a word), rather than specimen them with wretched (however beautiful) four-winged impostures.—*W. Hambrough.*

SPIDER'S FOOT.—Mr. Moginie has forwarded to me a curiously prepared slide of a spider's foot. He says the creature was captured by a friend of his last autumn, and on examining it, he found it was just about to shed its skin; all its parts, jaws, cephalothorax, and legs, being in duplicate; that is to say, the newly-formed limb in each case was within the old one. The slide, which has been drawn by Mr. A. Hammond, shows that the process of withdrawing the limb has begun (fig. 108). To find the cast-off skins of spiders, and even to see them changing their coats on summer evenings, is common; but I never before saw a prepared slide showing the process.—*S. J. M'Intire.*

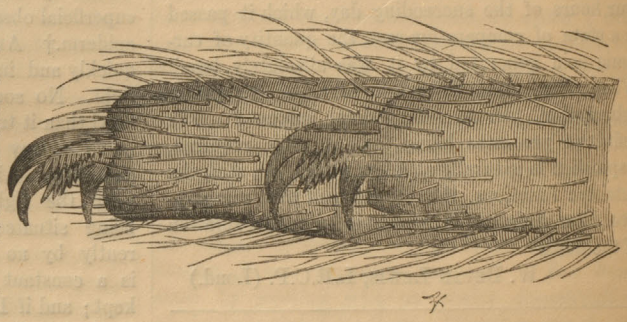


Fig. 108.

EARLY BIRDS.—Some of the summer birds are with us this year earlier than usual. As soon as ever that very severe weather which we had during March and up to the 6th day of April changed to a much warmer weather, the common Wagtail calls in upon us, and on April the 13th we find the Chiffchaff Warbler in our garden, and on the next day, April 14th, just before the great thunderstorm, the Chimney Swallow puts in an appearance; and on April 16th, the Willow Wren.

Although we are accustomed to see more or less of the Smaller Humming-bird Moth towards the end of summer down here, yet I certainly was surprised to find the Larger Humming-bird Moth hovering about the early bulbs in this garden so

early in the year as April 14th.—*W. P., Llandderfel, Merionethshire.*

Early Birds observed by John Lloyd at Battersea, Surrey.—The Wryneck, April 12th; Whitethroat, April 12th; Chiffchaff and Blackcap Warbler, April 15th; and House Martin, April 17th.—*W. P.*

Swallows were seen at Ashling, near Chichester, on the 9th of April; Wheatears at Ham, on the 8th. The Nightingale was heard at Slindon on the 10th, the Cuckoo at Salthill on the 11th, and the Whitethroat on the 12th.—*George Dale, Chichester.*

The Swallow (*Hirundo rustica*).—Three were seen on Sunday, the 11th of April, flying about this neighbourhood. In 1868 they were first seen on the 29th of March, and in 1867 on April 14th. The Cuckoo (*Cuculus canorus*) was heard here on the 18th of April, in 1868 on the 6th, and in 1867 on the 17th. Redstart (*Phœnicura ruticilla*) was first seen here on the 28th of April; but it was collecting materials for its nest, which it had commenced under the tiles of an outhouse, so that it must have been here for some days. In 1868 it was seen on the 26th, in 1867 on the 25th, in 1866 on the 14th, and in 1865 on the 27th.—*John Ranson, York.*

Perhaps the following dates of the arrival of some of our summer visitors here may be worth a corner in *S.-G.*:—Cuckoo (*Cuculus canorus*), April 9; Chiffchaff (*Sylvia rufa*), April 10; Willow Wren (*Sylvia trochilus*), April 11; Swallow (*Hirundo rustica*), April 12; Whitethroat (*Sylvia cinerea*), April 18; Sedgewarbler (*Sylvia phragmitis*), April 19; Tree-pipit (*Anthus arboreus*), April 19; Whinchat (*Sylvia rubetra*), May 5; Corncrake (*Gallinula crex*), May 5.—*F. G. Binnie, Healaugh Lodge, Tadcaster.*

The Cuckoo made its first appearance here on April 24th; the Chimney Swallow on the last day of the same month. I have as yet not had the fortune to hear our Land Kail: I fear that it has not reached us as yet.—*John Sim, West Cramlington, Northumberland.*

Otter in Norfolk.—Mr. Middleton will be glad to know that the Otter is still found in various parts of the county of Norfolk, particularly in the district known as the "Broads," where it not unfrequently occurs. So recently as about the 13th of March last a brace of young otters were taken at Trigby. The Black Rat was to be found in small numbers at Lynn about eighteen years ago, and, I doubt not, in other parts of the county; but it is long since I heard of its occurrence, and I fear its fiercer and stronger cousin has by this time exterminated it. The Badger is very rare with us.—*T. Southwell, Norwich.*

Insects and Light.—The theory of "George Guyon," that nocturnal insects, especially moths (not forgetting daddy-longlegs), make for the flame of a candle in a room as a probable means of exit from their confinement, seems worthy of attention, and finds support from his experiment with the flies in the test-tube. But still the question remains *why* do they come to the lightened room out of the gardens and fields without, where their natural food awaits them, and where they can roam at pleasure? Why should they come to a point of light placed in the field or garden, as my "American moth-trap" can testify they do? That they feel in a room "cribbed, cabined, and confined," I have no doubt; but *why* were they attracted thither? Thoughts *do* come into one's head sometimes, and, not being always consonant with scientific fact, or within the range of probability, are often put aside by ourselves, or are summarily "pooh-poohed" by our friends. But they *will* suggest themselves; and one that has suggested itself to me is the following:—We know (I have often seen it) that certain flowers emit of an evening a strong phosphoric light, visible at some little distance. How many do so whose light is only visible to the keen eyes of insects we do not know; but I think it probable that many more do than we are aware of. Is it too wild a suggestion that Nature has supplied these storehouses of insect food, the flowers, with this phosphoric glow, as a beacon-light to the hungry night rovers, and, responding to the invitation, that they make for our lighted rooms as to a banquet-hall? If this moves the risible muscles of any reader, all I can say is, "Grin away, but suggest something better." Passing to the *Carnivora*, who, on the contrary, dread the light, I would suggest the following as a reason for their doing so:—We know that their prairie homes are liable to become the scenes of the most appalling conflagrations, before which the wild beasts naturally flee in extremest terror, often fruitlessly. Is it not of the range of probability that instinct teaches them to dread any, even an insignificant appearance, nay, even the colour of flame? This would account for the frantic "roarings and howlings" which attended the exhibition of the light brought in front of their dens at the Zoological Gardens, as described by "George Guyon." It would also account for the dread manifested by elephants at the presence of fire. Should you think these suggestions worthy of notice, they are at your service.—*W. H.*

Otter and Badger.—Several correspondents (in *S.-G.*) relate instances of the recent capture of those rare, and in some parts of the country almost extinct, animals the Otter and Badger. We believe they are still to be met with occasionally in this neighbourhood. Within a few years they have been hunted in the Colne Valley, and not many months since we heard of a fine Otter being killed in the neighbourhood of Finchingfield.—*Halstead Times*, May 22, 1869.

BOTANY.

WOLFFIA ARRHIZA, WIMM.—I have discovered a new locality for this very minute, but very interesting Lemnad—viz., Byfleet, a village about three miles from Weybridge, in Surrey. It occurs in some quantity in a pond within the precincts of a garden. The pond is quite unconnected with any river or stream, excepting a ditch which forms an outlet from it. I observed that the plant has found its way into the ditch, but only for two or three yards from its junction with the pond. There is no other Lemna in the pond, or in the immediate neighbourhood. This is the third British station for *Wolffia*, the other two being Staines and Walthamstow.—*W. W. Spicer, Itchen Abbas.*

CLAYTONIA NEAR NORWICH.—When out walking with a friend at Eaton, looking for early wild flowers, we discovered a curious little plant, which, upon examination, proved to be the *Claytonia perfoliata*, a native of the Rocky Mountains. I showed my specimen to a gentleman, who told me he had found it also growing in the village of Rockland.—*E. A. N.* [See also p. 114, and (1868) pp. 115, 140, and 162]

THE SHAMROCK.—As the question of the identity of the Shamrock has interested me for some time, perhaps I may be allowed to say one word respecting it. I have read the notes on the subject in the March and April numbers of SCIENCE-GOSSIP, and I am inclined to favour the view that *Trifolium minus* is the plant in general use. Last year I had some plants of the Shamrock from Wexford, which I cultivated, and in no particular could I distinguish them from the *Trifolium minus*. This year I have some more authenticated Shamrocks from Cork, and as far as I can judge at present, they are plants of the same species. On the other hand, however, an Irish friend from Kildare showed me a sprig of "true Shamrock" (as he termed it), and this was a large-leaved trefoil, having a beautiful purple spot in each leaflet. This must have been the *Trifolium repens*, I imagine. I have seen a great number of plants received from various parts of Ireland this year and last, and in every instance, save the one just mentioned, I believe them to have been plants of the *Trifolium minus*. I may further add that a friend from Limerick assures me that the trefoil with spotted leaves is not considered in that county to be the true Shamrock.—*H. N., Oscott.*

ROOT-CUTTINGS.—At a meeting of the Royal Botanic Society on the 8th of May the secretary called attention to a novel method of propagating such plants as geraniums, fuchsias, &c.—viz., by cuttings taken from the *roots* instead of from the branches. The result, in the case of geraniums, was the production of a variety with *leaves* marked quite differently from those of the parent plant, the *flower* apparently remaining unchanged. For instance, the plants grown from a root-cutting of the well-known geranium, Mrs. Pollock, produced leaves marked with a simple horseshoe of a dark colour. From this and other specimens exhibited on the occasion it would seem that the varieties produced by root-cuttings had a tendency to revert to the original form from which the species have been derived; but the experiment is well worth pursuing further.—*R. H. Nisbett Browne.*

THE MISTLETOE.—I certainly had no intention, when classing the Mistletoe with Christmas berries, to imply, by so doing, that the ancient rites connected with it, and which your correspondent "T. W." evidently alludes to, were exclusively associated with Christmas Day. Neither did I think it necessary to allude to the Druidical ceremonies performed at the *commencement* of the New Year, when the plant in question, being distributed among the people as a sacred relic, was considered an effectual charm against every evil. Nor did I deem it requisite to mention local or county customs. I simply called it a Christmas berry, because it was, and is—so some of my young friends assure me—in great repute at Christmas time for decorative purposes; and the associations and ceremonies in which it then plays a part are still as much in vogue as ever in most of our English counties; but perhaps the good old custom of "kissing under the mistletoe bough" may have gone out of fashion in Herefordshire!! The Oak could never have been its common habitat, otherwise why should the Druids have made a *search* for it at a period when this little island of ours was densely covered with huge forests of Oak? But I know that many botanists say that the *Loranthus Europæus*, which is now very frequently found in the South of Europe upon the Oak, was the true Mistletoe plant of our forefathers, and that when Druidism was driven from Britain, the sacred plant was also entirely destroyed.—*Helen E. Watney.*

SYMPHYTUM TUBEROSUM (*L.*).—I do not know if this rarity has been noted as a Middlesex plant. I discovered it a few days since growing luxuriantly a few miles north of London.—*James W. White.*

OPHRYS LUTEA?—At a meeting of the Royal Horticultural Society, held on May 3rd, "Dr. Masters exhibited, on the part of G. C. Oxenden, Esq., some drawings representing a plant found wild in East Kent, which was said to be *Ophrys lutea*, but which, far more probably, was a yellow-flowered variety of the Bee Orchis. The drawings differed materially from the true *Ophrys lutea*. In any case, the present is a singular variety, which has, as it seems, hitherto escaped observation."—*Gardeners' Chronicle*, May 8, 1869.

MICROSCOPY.

VULCANITE CELLS.—I have lately had a supply of Vulcanite Cells from Messrs. Pumphrey, of Birmingham, and I can safely say they are the best cells that I have used for mounting objects, dry or in fluid, being far superior to tin or glass cells, as in change of temperature there is no give in glass or tin, and the cement cracks; but here we have a substance in every way suited to the wants of the Microscopist, as the cells can be had in various sizes, as slides 3 × 1, perforated with any sized holes, and also as discs to mount opaque objects on, or to act as a stop to the Lieburkuhn. I have until lately used cells made of the vulcanized rubber, but these had some disadvantages which are overcome by the Vulcanite Cells. I find, in cementing them to the glass slide, a scratch with a fine file on the polished surface causes the marine glue to hold very firm, and also the top side when cementing down the glass cover; they can also be ground down to any thickness required by reducing them with a file first, and finishing off on a flat surface to obtain the cell perfectly level to receive the glass cover.—*J. E. Turner.*

BACILLARIA PARADOXA.—From the latter part of your reply to "T. S.'s "query, page 72 of the March number of SCIENCE-GOSSIP (a periodical not sufficiently known in this country), it would appear that you doubt the presence of *Bacillaria paradoxa* in fresh water. The following may therefore interest you and your readers:—In December, 1861, I found the *Bacillaria paradoxa* most plentiful in gatherings from a running stream about two miles from Ahmednugger (Bombay Presidency). Now Ahmednugger is about a hundred and thirty miles from the sea as the crow flies, and some sixty miles from the high range of ghauts dividing the Deccan, or High Land, from the Concan, or Low Land. I have since found it in abundance in the ditches near Poona, which is also above the ghauts; so that I consider it is an established fact that this diatom is to be found in fresh as well as salt water; in short, I have never found it in any estuary or brackish water, but always in fresh water. At page 148 of the April (1862) number of the *Quarterly Journal of Microscopical Science*, the Rev. R. Douglas mentions having found this diatom in ditches near the river a short distance above the town of Stafford. I cannot but think that the specific title of *Militaris* would be better suited for this beautiful and most peculiar diatom; for never have I seen a better representation of the movements of a regiment deploying into line and re-forming column, than in the unaccountable movements of this diatom.—*Julian Hobson, Major H.M. Bombay Staff Corps, Mhow, Bombay Pres., India.*

DRAWING FROM THE MICROSCOPE. — In the April number of SCIENCE-GOSSIP, your correspondent W. Scantlebury gives a very useful suggestion under the above heading. I have for some time employed means somewhat similar for projecting the magnified image of an object on paper, but with this important difference:—instead of the special apparatus described by your correspondent, I use a Wollaston's Camera Lucida fixed over the eye-piece in the usual way, *only reversed;* that is, the flat part of the reflector turned *down* instead of up. The size of the reflected image can be varied by altering the distance between the reflector and the paper on which the drawing is to be made, of course re-focussing for each change. The great difficulty I experience is in obtaining a sufficiency of light to delineate clearly the details of structure. I use a one and a half inch objective (Beck's), and condense the rays of light through a large bull's-eye. It is very important to exclude all extraneous light, for which purpose I use a sort of screen, made of pieces of millboard, and which, placed round the microscope and the lamp, forms a kind of dark chamber for the projected image to fall on the paper. Perhaps some of your correspondents may be able to suggest means of intensifying the light to a greater degree than can be obtained either with the mirror or the bull's-eye, although I consider the latter, carefully adjusted, superior to the former. In using the Binocular Microscope, the prism must of course be drawn back so as to allow the whole rays from the object-glass to pass into the straight body.—*W. E. B., Swansea.*

THE STATE MICROSCOPICAL SOCIETY OF ILLINOIS. —We have received a copy of the Act incorporating this society. At p. 54 we announced its establishment at Chicago, and congratulated the promoters on their success, which we hope will be continuous. They have the heartiest wishes of their Anglican cousins and fellow-students.

NORFOLK AND NORWICH NATURALISTS' SOCIETY. —We are glad to see our Norwich friends so vigorous and hopeful in starting this new society. It commences under the presidency of the Rev. Joseph Crompton, and with our friends H. Stevenson, F.L.S., the author of the "Birds of Norfolk," and F. Kitton—a name familiar to readers of this journal—as vice-presidents. The appearance of other names on the executive, well known for their earnestness and perseverance, assures us that they intend to succeed, towards which consummation we wish them "good speed."

FORAMINIFERA.—The bibliography of Foraminifera is now being published in consecutive numbers of the Journal of the Quekett Microscopical Club.

NOTES AND QUERIES.

ABNORMAL DANDELIONS.—How very provoking! Do not the text-books tell us that a "scape" is a leafless, branchless flower stalk? And yet one correspondent sends us a scape of Dandelion with a well-marked leaf projecting from it, and another (W. W. S.) sends us one with a second head of flowers projecting at an acute angle from the main stalk. The latter case must be set down as an instance of prolification of the inflorescence. From the axil of one of the bracts has proceeded a secondary scape, hence the prolification. The peccant bract, moreover, is at some distance below the others, which are too regular in their behaviour to associate with their eccentric brother.—*M. T. M.*

PARROQUET BREEDING.—A friend of mine has a pair of Parroquets or Love-birds: the hen lays a quantity of eggs in the season, but when she has been sitting for a short time her health fails, and she nearly dies. Would any of your correspondents be good enough to inform me what is the food on which they should be fed? Bread and milk, biscuit, egg, &c., have been tried, but to no purpose; they have refused everything thus far except canary and rape seed.—*T. B. N.*

AN INTERLOPER.—On looking at my cabinet of moths a few days ago, I was surprised to find the head and throat of a Death's-head moth covered with what at first I supposed to be a vegetable growth, which extended beyond the tips of the antennæ; but, on closer examination, it proved to be hair from the breast of the moth, eaten off by a maggot or gentle nearly an inch long. The moth was given to me last year by a friend the day after it emerged from the chrysalis, when I killed it by sowsing it very liberally with benzole, which I am *told* is a certain preservative; the case also contains nearly an ounce of camphor. I am greatly puzzled to know how the maggot got into the case. I have mounted some of the hair, and find it makes a beautiful object for the microscope. Should any of your readers like to have some of it, I shall be pleased to send them a small quantity on receipt of address with stamp.—*Alfred Allen, Felstead, Essex.*

INDIGENOUS TREES.—What is understood by the word indigenous? Summarily it means "to grow spontaneously in any natural soil;" but what is it to grow spontaneously? 1. Are we to suppose that the seed or root is a natural production of the soil, which, by the operation of natural laws, produced the first tree or plant ever placed there? This were to suppose mother earth self-endued with the first principles of germination. 2. Or that a tree or shrub, having been planted in a given locality, and the soil being of suitable kind, said tree or shrub will ever after flourish there? This planting may have been a divine act of creation or of human transportation; seed may have been wafted by wind or by water, or conveyed by animal agency. This would leave us to the conclusion that "indigenous" is only a comparative term, and that once was a period when no tree or shrub existed. Geology does certify this fact, but we have at present only Scripture to show how the first tree or shrub came into existence. This may be illustrated by a case in point. "Cæsar's Commentaries," book v., c. 12, states that the Britons have timber of every kind, as in Gaul, *except* "fagum" and "abietem;" *abietem* means the fir, but *fagum*, which ordinarily means the beech (*Fagus sylvatica*), seems misapplied, for, say writers, the beech is indigenous here; therefore it may mean the sweet chestnut (*Castanea vesca*). The ancient Britons called the beech *ffa-wydd*, *i.e.*, the bean-tree, because pigs eat the *beans* thereof; but it will be observed that *ffa* is the prefix of *fagus*, and in Latin *faba* is a bean. Query, Would Britons apply a Latin name to a tree known to them before the Romans landed? The word beech is Saxon, *buccan*. I may remind your readers that the beech is said to have been recently found, fossilized, in Irish strata. The beech-tree being indigenous here, the box-tree is also said to be indigenous, because found growing wild in Surrey; the oak-tree, also, among others, and the fir (*Pinus sylvestris*) is called indigenous to Scotland. With these examples before us, I wish to ask how many centuries would suffice to give such appearance of *home* to the habitat of a plant as that it comes to be regarded as indigenous or aboriginal? The subject might be extended to some of the doubtful trees and shrubs mentioned in Scripture, but want of space forbids it at present.—*A. Hall.*

LOCAL NAME OF BUTTERFLIES, ETC.—A native of these parts distinguishes between the *Pieridæ*, as represented by the "Whites," and the *Vanessidæ*, as far as the Peacock and Red Admiral are concerned. The former are "butterflies," the latter "hobhowchins." Garden snails are here called "huddieduddies," a word which seems to express their soft slimy nature. Can any reader supply the derivation of "hobhowchins"?—*James Britten, High Wycombe.*

FOOD OF TORTOISE.—The tortoise referred to by "J. H." may have been waiting till more decided summer weather restored its appetite; but, as the *kind* of tortoise is not named, it may have been supplied with unsuitable food. The land tortoise is herbivorous, and a lady who had one in her garden complained to me that it attacked any plant which bore a yellow flower. The water tortoise, often seen in aquaria, is, on the contrary, carnivorous. When I first obtained some a few years ago, being ignorant of their food, I tried them with various plants, but they refused them all. As an experiment, I offered a piece of a mutton-chop, and found it much more to their taste, after which I usually supplied them with raw beef, presenting it on the point of a wire, but their extreme slowness in making up their mind is rather trying to the patience.—*G. Guyon, Ventnor, Isle of Wight.*

AFFECTION BETWEEN A COW AND A PIG.—Walking one day in the neighbourhood of Bath accompanied by a dog of the most discursively inquisitive disposition, and whose researches were somewhat noisily pursued, we came to a field where a number of cows were quietly browsing at some distance from the path we followed. In pursuing his investigations "Tip" alarmed a fine porker of some six months old, near the stile by which we were about to leave the field. Not knowing the dog as well as I did, his somewhat rough manners alarmed the pig, who grunted loudly and ran away, pursued by the dog, who tried to explain that he meant no harm. No sooner, however, had the pig shown symptoms of being in danger than one of the cows at the other side of the field pricked up her ears and trotted rapidly towards the scene of action. The pig, with a grunt of satisfaction, took refuge under her legs; and the cow, keeping a sharp look-out at the dog, devoted herself to calm the alarmed pig by licking it carefully all over. I

called the dog off, and we passed into the next field, but as long as we continued in sight the cow guarded her porcine friend jealously.—*J. B. Keene.*

AGE OF FISH.—Can any correspondent inform me if there is any guide for telling the age of fish, say a 38lb. or 40lb. salmon, or a large turbot?—*R.*

RHAMNUS FRANGULA.—Can any of your correspondents tell me what is the vulgar German name given by the foresters to *Rhamnus frangula*, which grows in some of the forests in Germany, and is thence exported to England, peeled, for the manufacture of the best sporting and small-arm gunpowder?—*George E. Frere.*

[The names applied to this plant are very numerous, as the following will show:—Der Faulbaum, Die Schwarze Faulbeere, Schwarze Schiessbeere, Stinkbaum, Schwarze Erle, Schwarzholz, Beerenholz, Knitschelbeere, Almer, Amselkirsche, Drosselkirsche, Vogelkirsche, Fluhrbirlein, Gilbholz, Grindbaum, Lausbaum, Mausbaum, Zweckenbaum, Wiedebaum, Elsebaum, Spillbaum, Sporgelbaum, Deutscher Rhabarberbaum, Purgierbaum, Hühneraugenbaum, Drachenbaum, Pulverholz, Pinnholz, Sporkenholz, Spackerholz, Sprötzerholz, Spreckenholz, Spräzern, Zapfenholz, Butterstielholz, Hinholz, Becheer, Spicker, Hohlkirsche, Ahlkirsche.—ED. S.-G.]

NEW FOOD FOR SILKWORMS.—In the *Illustrated Sydney News* of the 28th November, 1868, page 863, is the following:—"A native shrub has just been discovered, both on Phillip Island and the shores of the western port bay, which is far better than mulberry for feeding silkworms. Silkworms raised upon it produce far more silk than those bred in any other manner."—*F. M.*

SWINEY LECTURES (Royal School of Mines).—The public are admitted, free of expense, to Dr. Cobbold's Lectures on Saturday and Monday evenings, at eight o'clock, commencing the 1st of May.

GREEN DRAKE.—On Sunday last (April 25th) a May fly was brought into my house, having settled on the coat of a friend who called upon me; he, with two others, being fishermen, pronounced it a "Green Drake," and they stated it to be unnaturally early.—*J. S. Whittem, Walsgrave.*

FUNGI.—Please tell me what plant is intended by this note which I copy from a botanist's manuscript notebook:—"Fungus ramosus maximus, Brassicæ, cauliforæ facie et magnitudine; observed in meadows nigh my own house, on September 27th, 1703." And this, No. 44 of Ray's "Synopsis" (1696), at p. 19:—"Fungus spongiosus maximus, etc. I have observed membranes of this five or six inches over, of the colour and softness of shamy [chamois] leather, amongst half decayed oake wood; and is much used in this country (Yorkshire) by the cloth makers to dy broun, and called by them 'rottenwood.' I tooke alsoe large pieces of the like membraneouse substance out of the decayed wood of an old yew-tree at Botley Hall, 1698."—*W. P.*

CATS.—I think "J. H." is under a mistaken impression if he continues to believe that cats only on such occasions as he describes exhibit the manifestations referred to. Five years' experience of the manners of these animals enables me to speak pretty confidently concerning them, and I can state with assurance that they scratch chairs, wood, &c., for the sake of sharpening their claws; and this being borne in mind, it is obvious the advent of a storm cannot in any way interfere with these actions, which are manifested at no fixed occasions. It is well known that the cat is a great nuisance in a garden on account of this very propensity. As regards their prophetic ability, I have never seen any of those symptoms usually exhibited by cats when labouring under apprehension or illness, as depression of one or both ears, restlessness, &c.—*W. W. S. Beaufort.*

RED GROUSE (*Lagopus Scoticus*).—H. C. Sargent wishes to know if Red Grouse pair or are polygamous. Being plentiful in this locality (West Riding of Yorkshire), we have ample means of studying their habits, and that they pair is beyond question. In spring I have often observed them in pairs, and never more than one female with the male. While the hen is sitting, the cock may often be seen upon some rock or stone near, ready to warn her upon the approach of danger. The young chicks are also accompanied by both parents, the male leading off the brood during the shooting season, which could not be if he had more than one family to attend. In confirmation of the above facts I quote from the Rev. F. O. Morris's "British Birds," vol. iii., p. 345: "The Moorcock pairs early in spring, commonly in January, but sometimes even earlier." Page 346: "The Heath-Poults leave the nests shortly after they are hatched, and are soon able to fly. They keep together till the autumn, unless dispersed by shooters. They are attended by both the parents." And in "Goldsmith's Animated Nature," by Fullarton & Co., vol. ii., p. 72, in the supplementary note on Red Grouse (*Lagopus Scoticus*), "The male is not polygamous, nor does he at any time desert his mate. When incubation is over, and the young run about, they are tended by both parents."—*E. Seville.*

A RECIPE FOR JAUNDICE.—The other day a person called at our house, seeing that we kept geese, and asked permission to gather some of their excrement. We inquired for what purpose it was wanted. His reply was, to make pills for the yellow jaundice; and, says he, it is a *very old recipe*, a certain cure, and the patient was going to take some as a last resource, having had several doctors, but they could do him no good. Doubtless the faith of the patient in the efficacy of the compound goes a great way. It appears the excrement is melted down with beeswax before made into pills.—*J. R. W. H., Wolverhampton.*

REDUCED SCIENTIFIC POSTAGE.—If the free postal circulation of scientific journals contributed to supply either a luxury or a means of pecuniary emolument to those who work at science, we should be the last in the world to advocate such a measure. But manifestly it is not so. It may be true of two or three general and popular serials; but in regard to the technical scientific periodicals it certainly is not the case. None but the scientific man *pur et simple* reads these publications; and not even the most enterprising scientific speculator could derive pecuniarily profitable results from their perusal. Under these circumstances, then, we would urge on the serious attention of the postal authorities the propriety of going into this question of reduced scientific postage, with a view to removing what we certainly regard as a trammel to the development of our national resources.—*Scientific Opinion.*

QUILKIN AND PADGEY-POW.—These terms, which are mentioned by "E. H. W." as having been in use until lately in West Cornwall to signify respectively the frog and the lizard, are genuine Celtic words, and are both to be found in the Cornish glossary at the end of Dr. Borlase's renowned "Antiquities of Cornwall." In 1866 I showed a frog to a poor man from the neighbourhood of St. Austell. He did not even know it by the term "frog," but said it was what in his parts was called a "quilkin."—*W. R. Tate*, 4, *Grove Place, Denmark Hill.*

RAT MISCHIEF.—The inclosed is an extract from the list of presents to the museum of the Royal United Service Institution, Whitehall Yard, as appears in their journal, No. LII., 1868. I send it, thinking that it may interest your readers:—"RAT'S NEST AND YOUNG.—The nest was set on fire by a lucifer match, ignited by the old rat as she worked it into her nest. A fire was nearly caused thereby on board H.M.S. *Revenge*. Lieut. A. H. Gilmore, R.N."—*W. Dickinson.*

EGG DEFORMITY.—I have lately received an interesting monstrosity of the lapwing's egg (*Vanellus cristatus*) taken on Flixton Wold, near Scarborough, April, 1869. The chief characteristic is its diminutive size, measuring only 1·00 inch in length, by ·87 inch in breadth. The *average* size of the ordinary egg appears to be about 1·70 inch in length, and 1·20 inch in breadth, and the *average* weight *un*blown about 450 grains; whilst the weight of the monstrosity was only 102 grains. The yolk of this egg was very small. The specimen also differs much from the ordinary type in regard to *shape*, being very rounded at the smaller end, very unlike the usual pointed form of the eggs of this species. I am informed by a naturalist that monstrosities of the lapwing's egg are not *common*, but he does not hesitate to give his opinion that it is the egg of that bird. If any of your readers may possess *smaller* specimens of the egg it would be interesting to know.—*J. H. A., Scarborough.*

TURTLEDOVE. — It is an article of "folk-lore" in the North of England that turtledoves pair for life, and that on the death of one the other pines away. From Lope de Vega's play "La Dama Melindrosa" we find the same idea is current in Spain.

Lisardo. The turtledove, when widowed, will not sing,
Nor wed again, nor perch on the green boughs.
Tiberio. Then pray where does she perch?
Lisardo. On withered boughs,
On thorns.
Tiberio. On thorns? Egad, you're right! The dove
Affords a faithful illustration of your state.
For certainly—if we may judge by signs—
So restless are they and so fidgety—
Widows do sit on thorns.

—*John Ranson, Linton-on-Ouse.*

THE HEDGEHOG.—Your graphic description of the untimely end of the hedgehog through the larva of the blow-fly reminds me of what I have noticed more than once in my garden, where a colony of hedgehogs has been long established. Last autumn a young one was brought into the house so swarming with fleas that it was drowned to get rid of the pests, as a dog would keep attacking it, and became equally infested, much to our annoyance. The fleas, after inflicting but one bite on those of humankind who became troubled with them, speedily died. They were longer in the body than the ordinary flea. —*B. C., F.R.C.S.*

HEMLOCK.—I believe the Rev. S. A. Brenan will find that when this plant is eaten with impunity by Russians in their own climate, they always take very good care to boil it in several waters, and hence we may readily understand how this process, and not the difference of either soil or clime, renders it non-injurious. The poisonous properties found in so many of our plants are entirely destroyed (dissipated is, I think, the proper word) by the application of heat. Linnæus's anecdote respecting the old Norland woman, who, to his intense horror, boiled some aconite leaves in broth, must be familiar to all who have read his "Lapland Tour." The great botanist, after noticing the strange fact that although four persons partook of this terrible compound, "none of them seemed one penny the worse," remarks "that the active principle in the aconite, as in most of the Ranunculaceæ, is extremely volatile, and dispersed in a great measure by heat." Doubtless this is likewise the case in the hemlock, although it belongs to a different natural order. The arum (*Arum maculatum*) furnishes us with another example. It is exceedingly poisonous, yet Portland sago is made from it: repeated washings, and then the agency of heat, deprives the powder prepared from its roots of all acrimony. Depend on it—

Every green herb, from the lotus to the darnel,
Is rich with delicate aids to help incurious man.

I asked, when told of the notice in the *Pall Mall* to which Mr. Brenan alludes, Did Mr. Harley, like the pilgrim of old, *boil* the peas?—*Helen E. Watney.*

BLOOD.—I see it stated in all the books that blood consists of *white* as well as red globules. I am afraid I shall draw a hornets' nest about me if I venture to doubt upon this subject; I take it for granted it is right because so many say so, but I cannot satisfy *myself* about it. It spoils the globules to put water to them, unless some salt is put into it, but I never try anything but the blood itself. It is rather difficult to put the blood on a slip of glass so as to see the globules properly, as their shape is so easily destroyed. The state of the globules is considerably affected by the state of the health. The best way to see them is to put a drop of blood on the glass, and then shake it off, when the perfect globules will be seen at the edge. Unless it be carefully done, you may see few of the coloured ones, but only because the health is not right, or they are injured. The imperfect ones look apparently colourless, but on a good specimen you can find few white ones, for by carefully observing the globules the red spot may be observed in every state of distinctness till it quite disappears. The perfect ones have a bright red centre, surrounded by a *bluish ring*, and the circumference transparent. They must be somewhat convex, as I have seen the flame of a candle inverted in them. I always fancy it is from seeing the imperfect ones mixed with the perfect ones that causes it to be considered there are two kinds, and the health certainly has an effect upon the colouring matter. When once obtained they will keep for years. Now how can I tell when I see a white globule that it is not an altered red one? as I can trace them down, down, till I can see no colour.—*E. T. Scott.*

FISH MOTH.—The pretty Lepisma is, I am sorry to say, a sad injurer to the covers of books, both inside and out, if the place where they are kept is at all damp. I fancy the paste has something to do with it, though they don't *confine* themselves to the pasted paper.—*E. T. S.*

TESTACELLA.—The other day, while digging in my garden, I was somewhat surprised on turning up what appeared to me to be a testacella. It was 2 inches long; the shield was a quarter of an inch in length, somewhat less in breadth. As I never heard of it occurring in Ireland before, I thought it might be an interesting fact for naturalists to be recorded. On referring to some natural history books, I find that they agree that its food consists of earthworms, which it catches by means of its tongue. Now what I am anxious to know is, if its diet consists of earthworms exclusively, or of earthworms, small insects, and vegetables; for if it did not feed on vegetables, then it would be an acquisition to a garden, and I would do my best to make it comfortable in mine.—*Edgar Hutchings.*

THE MAIDEN OAK.—At Beech Lane, a large village near Birmingham, there is a full-grown oak—the common British (*Quercus robur*)—called by the inhabitants the "Maiden Oak," from the fact of its never having grown a single acorn,—not producing even one last year, which was the most prolific season of acorns known in the Midland Counties within the memory of any resident now living, almost every tree yielding great quantities. Is this non-fruit-bearing oak a common or a very rare instance, and can any person of practical experience give any information why a particular oak is non-productive?—*Henry Dingley.*

FOSSIL CORAL (p. 119).—The generic name printed *Montlivantha* should have been *Montlivaultia.*—*W. S. K.*

VEGETABLE SEEDS.—There have been several interesting notices in SCIENCE-GOSSIP of different seeds, but some of our common ones are well worthy of notice, such as the dandelion, sow-thistle, fern seeds in different stages and with polarized light, and last, not least, the seed of the ox-eye daisy when fresh: this is of a fine purple colour, with white ribs, and forms a very pretty opaque object.—*E. T. S.*

FUNGIA PATELLARIS (p. 95).—This is a recent species, and is *not* common in the carboniferous formation, no species of *Fungia* being found lower than the Oolite. The aporose corals, of which this is one, may be distinguished by the sextupal arrangement of their principal lamellæ. They are not found in the carboniferous limestone. The rugose corals, common in the mountain limestone, have a quadruple arrangement of (principal) lamellæ.



Fig. 109.
Section of *F. patellaris*, Aporosa type.



Fig. 110.
Section of *Polycœlia profunda*, Rugosa type.

Fungia patellaris is figured by Edwards and Haime in the "Annales des Sciences Naturelles," vol. ix., pl. 6.—*John Hopkinson.*

THE LEECH.—I have much pleasure in corroborating the statement of your correspondent "H.," p. 93 of the April number of SCIENCE-GOSSIP, respecting "Leeches." The same desire to preserve them alive after availing myself of their useful services induced me to try precisely the same plan as that of "H.," having invariably found the "salting process" fatal to them. I need not repeat the *modus operandi*, except in stating that I placed mine in a glass jar by themselves for several days, during which time the water became discoloured, or, more correctly, coloured at intervals, of a carmine hue, from their disgorging *naturally* a portion of their meal. When this had ceased, I removed them to another jar, similarly stocked to that of "H.'s." In about seven weeks one (of the two I introduced) died; the other I kept for months in apparently perfect health; but, unfortunately, I one day removed the perforated cover of the jar, and the next morning my leech had made his escape. Why it should be thought necessary to cause them to disgorge immediately after taking a meal I am unable to say; perhaps some of your numerous readers, better versed in the physiology of the *Hirudo medicinalis*, may be able to inform us. We are informed that "the operation of digestion in the Leech is extremely slow; more than a year will sometimes elapse before the blood has passed through the intestines in the ordinary manner, during all which period so much of the blood as remains undigested in the stomach continues in a fluid state, and as if just taken in, notwithstanding the vast difference in the heat of the body of a mammiferous animal and that of a leech."—(*Griffith, An. King.*, quoted in *Cuvier's An. King.* Orr & Co.)—*N. P.*

A NATURAL SNAIL-TRAP.—I have so frequently observed the accumulation, or rather congregation, of the common garden snail upon the bark and off-shoots of the Laburnum that I always visit those trees, and with unvarying success, to reduce the number of such garden pests. The Yacca also seems to be a favourite roosting-place for the same mollusc.—*B. C.*

A PINING TORTOISE.—"J. H." need not despair of his tortoise, as I believe they seldom begin to feed much before May. I kept one in our garden here for two years, and in neither year did it feed before that. In June and July it was rather voracious, being most partial to convolvulus-leaves. They can can go a long time without food, even in the summer, and are exceedingly long-lived.—*W. R. Tate, 4, Grove Place, Denmark Hill.*

MICROSCOPIC PREPARATION.—Will any correspondent kindly describe the process used in preparing for mounting the beautiful transparent injections, such as "cat's tongue," &c., which, I believe, come over from Germany?—*H. W.*

COCHLEARIA OFFICINALIS.—This species I believe to be truly perennial. I have a plant in full bloom now before me, that has grown in a friend's garden from one root, for several years in succession. This year's shoots spring from an old woody root that is evidently neither annual nor biennial. Standard authorities, however, are against this view; Gray, Withering, and Hooker say it is an annual; Babington says biennial, but adds a query.—*S. A. S., Belfast.*

ORCHIDS WANTED.—Will any one send me *fresh* specimens of any of the less common Orchids, except *Orchis militaris*, and the commoner chalk species? I particularly want *O. fusca*, *O. taphrosanthos*, and *O. ustulata*, as well as any of the more northern species. Fresh specimens of *Geranium sylvaticum* and *G. rotundifolium* will be thankfully received. I can offer several good plants in exchange.—*James Britten, High Wycombe.*

NOTICES TO CORRESPONDENTS.

W. S. and J. J.—Must not send so many mosses again, as we cannot name "by the lump."

M. G. F.—The common snake (*Tropidonotus natrix*): feed it on little frogs.

W. E.—Trübner & Co., Paternoster Row, London. "The Dental Register" is three dollars per annum.

E. H. K.—Had you been a "constant reader" of SCIENCE-GOSSIP you would have seen the numerous recent communications on this subject.

Erratum (see p. 109).—"Large Egg." The length should have been $3\frac{4}{6}$ and not $3\frac{3}{6}$, as stated.

H. C. S.—Nothing novel.

W. H. D.—We really cannot reopen the discussion. Your anecdote is not more conclusive than many others on record.

W. A. F.—Eggs of the moths named may be obtained of Dr. A. Wallace, Colchester, Essex.

W. H. J.—No. 1, *Coleosporium pingue*. No. 2, *Uredo potentillarum* on Burnet.

W. H.—All the entomologists to whom your drawing has been submitted regard it as a variety of *P. alexis*.

C. S.—We find that experienced entomologists agree in regarding your (supposed) new species as only a variety of *Strenia clathrata*.

H. F. M.—Cockroaches are what are called "black beetles," although not beetles at all.

F. R. M.—No. 1 is possibly *Davallia* (*Leucostegia*) *chærophylla*, Wallich; but we cannot say with certainty, as there is neither fruit nor rhizome.—J. G. B.

W. H. D.—We do not remember such a book.

J. B. K.—It is not uncommon for parrots to lay eggs in captivity in this country.

R. H.—The small round worm found in the intestinal canal of the Whiting (*Merlangus vulgaris*) is a full-grown female example of the *Ascaris clavata* of Rudolphi. This parasite infests the Gadidæ generally.—S. C.

E. H.—1. Many species of grasshopper are "common." We cannot reply to so inexact a question. 2. In America at least three species of moths have larvæ, called "army-worms," i. e., *Anomis xylina* and *Leucania unipuncta*, both belonging to the *Noctuidæ*; and *Clisiocampa sylvatica*, belonging to the *Bombycidæ*. I believe the German "heer-worm" is the larva of *Bombyx processionia*.—R. Mc L.

R. G.—Certainly not a lichen; at present we fail to discover what it is.

F. S.—(1) Cover with powdered lime and expose to the air. (2) Dip them in benzole.—F. M.

B. C.—The larva found in the pear-tree is doubtless that of a moth, *Zeuzera æsculi*.—F. M.

J. W. L.—Your plant is Wild Garlic, or Ramson's *Allium ursinum*. In forwarding specimens for identification, an *entire* plant, or, at the least, leaves and flowers, should be sent.—B.

Y. Z. Z.—We only undertake to conduct exchanges for foreign correspondents. Your own address must be inserted.

J. W. L.—Your "exchange" is too long.

J. W. W.—We have often found the fungus *Ustilago receptaculorum* filling the involucres of goatsbeard. Others affect species of polygonum, the anthers of *Lychnis*, &c.—See "Microscopic Fungi," p. 82, pl. v., fig. 92.

J. J.—1. Hypnum prælongum. 2. Bryum cœspiticium. 4. Mnium hornum. 5. Tetraphis pellucida. 6. Hypnum prælongum.—*R. D.*

W. S.—1. Fissidens bryoides. 2. Ceratodon purpureus. 3. Hypnum rivulare. 4. Ceratodon purpureus. 5. Weisia controversa. 6. Plagiotherium sylvaticum.—*R. B.*

T. H.—1. Hypnum cuspidatum. 2. H. rivulare. 3, 4. H. Swartzii.—*R. B.*

R. G.—1. Dicranum fuscescens. 2. D. scoparium β orthophyllum. 3. Antitrichia curtipendula. 4. Bryum intermedium.—*R. B.*

EXCHANGES.

AMERICAN UNIOS for the varieties of *U. Margaritifer*.—G. Sherriff Tye, 58, Villa Road, Handsworth, Birmingham.

AN AMERICAN CORRESPONDENT has duplicates of—1. Ravenal's "Fungi Caroliniani Exsiccati;" 5 vols., 4to., each containing 100 species of fungi, being in all 600 species, with printed labels. 2. Sullivant's "Icones Muscorum," figures and descriptions of most eastern North American Mosses, not before figured; 1 vol., Royal 8vo., with 129 copper plates, which he wants to exchange. No. 1 for Braun & Rabenhorst's "Characeæ Eur. Exsic.," and Rabenhorst's "Cryptogamæ Vasculares Europ.," together; or for Gottsche & Rabenhorst's "Hepaticeæ Europ." alone. And No. 2 for Hooker's "Species Filicum," vols. iv. and v.; or for Schkuhr's "Krypt. Gewächse," 259 plates; or for Kunze's "Farnkräuter," 140 plates.—D. A. P. W., care of the Editor.

LAND SHELLS, British and Foreign, for British Eggs.—C. Ashford, Grove House, Tottenham, N.

MOSSES AND HEPATICÆ.—George Stabler, Levens, Milnthorpe, is desirous of exchanging these for other species of Hepaticæ.

TRANSPARENT INJECTIONS.—A few good slides offered in exchange for other good mounted objects of interest. Send lists to G. C. Gowan, 20, Beauchamp Square, Leamington.

ECHINUS SPINES.—Sections mounted, for good slides of selected diatoms, except *Pleurosigma formosum*, or *quadratum*, or other mounted objects.—Robert G. Andrews, Castle-street, Hertford.

LARVÆ OF LIPARIS DISPAR.—On receipt of a box and stamps for postage.—J. Stewart, 28, St. John-street, Perth, N.B.

BUTTERFLIES' WINGS and other objects of interest for mounting offered in exchange for other objects, mounted or unmounted. Lists exchanged.—G. Bowen, 95, Hampon-street, Birmingham.

EGGS OF STORM PETREL and others offered for those of the raven, hawfinch, ruff, or gannet.—Jno. H. Ashford, Scarborough.

GOOD SLIDES will be given for the different varieties of Pepper stems.—T. Sharpe, Low Ackworth, Pontefract.

SPINES OF ECHINUS unmounted for anything of interest.—Send stamped envelope to R. H. Alderman, 14, Coal Exchange, E.C.

POLLEN OF PASSION FLOWER and Fructification of Royal Fern, for other good mounted objects.—W. H. R., 12, Bonaccord Lane, Aberdeen, N.B.

GENTIANA VERNA.—Roots of this rare plant in exchange for British lepidoptera, or British birds' eggs. Reply in three days if accepted.—Alfred Pickard, Wolsingham, Darlington.

TERRESTRIAL CONCHOLOGY.—Correspondence and exchanges wanted with American, Continental, Colonial, or other foreign conchologists, by G. Sheriff Tye, Hon. Sec. of Conchological Section, Birmingham N.H. Society, 58, Villa Road, Handsworth, Staffordshire, England.

EGG CLUSTER OF WHELK.—Send any other microscopic object, or stamped and directed envelope, to F. S., Post Office, Rugeley.

L. CONVOLVULI and others in exchange for *E. versicolor* or other good lepidoptera.—Send lists to H. H. O'Farrell, 10, Douro Place, Kensington.

FRITILLARIA MELEAGRIS, Senecio squalidus, Crocus vernus, &c., for other rare British plants.—Send lists to E. W., 21, West St., Banbury.

FERNS.—Wanted to exchange plants.—Address for list to J. W. Lloyd, Kington, Herefordshire.

BOOKS RECEIVED.

"Scientific Opinion." Part VI. May, 1869. London Wyman & Sons.

"The Gardener's Magazine." Part XLI. Vol. XII. May, 1869. London: E. W. Allen.

"Second Lecture on Polar Magnetism: its Astronomical Origin, &c." By John A. Parker. New York: J. Wiley & Son.

"The Monthly Microscopical Journal." No. V. May, 1869. London: Robert Hardwicke.

"The Naturalist's Notebook." No. 29. May, 1869. London: 196, Strand.

"Land and Water." Nos. 170, 171, 172, 173, 174.

"The Canadian Entomologist." Nos. 7, 8, 9. February, March, and April, 1869. Toronto, Canada.

"Act incorporating 'The State Microscopical Society of Illinois' United States of America." March 31st, 1869.

"Le Naturaliste Canadien." No. 5. April, 1869. 81, rue de la Montagne, Quebec.

"The American Naturalist." Vol. III. parts 2 & 3. April and May, 1869. Salem: Peabody, Academy of Science.

"The Journal of the Ethnological Society of London for April, 1869." London: Trübner & Co.

"Chemical Labels according to the Latest System of Nomerclature." By H. Mathews and C. W. Quin. London: H. K. Lewis.

COMMUNICATIONS RECEIVED.—J. B.—J. H. A.—W. D.—J. R.—G. E. F.—S. J. M.—J. S. W.—G. D.—E. S.—J. Y. H.—A L.—E. H.—H. N. O.—C. A.—T. S.—W. P.—W. S. K.—J. N.—E. B.—W. B.—H. W.—H. W. (Oxon).—M. H.—E. H.—W. H. J.—H. C. S.—H. E. W.—E. T. S.—P. H. G.—A. H.—E. F. F.—W. W. S.—S. B.—R. H.—J. H.—R. T. A.—E. H. K.—H. D.—R. G.—J. C.—G. S.—W. E.—J. H.—G. C. G.—J. J.—W. S.—W. H. D.—M. G. F.—W. R. T.—E. S.—H. H. O. F.—J. R. W. H.—R. G.—F. S.—W. H.—A. P.—R. H. A.—F. G. B.—F. S.—H. F. M.—J. S.—W. W. S. B.—A. S.—J. W. L.—M. D. B.—J. B. K.—R. H. N. B.—N. J. S.—B. C.—G. G.—W. H. R.—G S. T.—T. B. N.—J. W. L.—Y. Z.—W. H. S.—J. W. W.—E. W.—G. B.—Oporto.—F. G. M.—W. R.—J. D. H.—J. B.—H. C. R.

LAMPREYS AND LAMPERNS.

BY MAJOR HOLLAND, R.M.L.I.

THE queries respecting these members of the family *Petromyzonidæ* which have appeared in the pages of this publication, have induced me to attempt to put together in a readable shape sundry odds and ends of notes concerning them collected from all possible sources and interwoven with the reminiscences of my own personal investigations made during a residence of nearly three years in Gloucester. While rummaging over the bibliography of these creatures to see what others had said about them, so many contradictions presented themselves, that it became evident that to procure a supply of them, and to study them in the flesh, with the aid of the scalpel, the syringe, and the microscope, was the only way to set one's mind at rest. A series of fresh specimens were obtained from the waters of "the blue Sabrina," and the appliances of the museum of the Royal Hospital, Haslar, brought into play to throw light upon their dark points. The readiness with which both Lampreys and Lamperns can be got, and their very remarkable structure, render them attractive and instructive subjects for the amateur, while the position which the order *Cyclostomata* occupies, as one of the connecting links between two great divisions of the animal kingdom, has ever made them objects of the highest interest to comparative anatomists and men of science.

"From whatever form or race of animals the zoologist advances towards the next succeeding it in the scale of nature, he will find himself insensibly led on by such gentle gradations that the transition from any one class to another is almost imperceptible. *Nihil per saltum* is one of the most obvious of the laws of creation."

In the cephalopods, the most highly organized members of the Fourth Division (*Mollusca*), we have the first appearance of an osseous system. The well-known "cuttlebone," or *sepiostaire*, common on every sea beach, and the *gladius* of the Calamary *Loligo* are but rudimentary shells, mere dermal secretions analogous to the shield-plates we find imbedded in the mantle of the slug; it is in the cranial cartilage and fin-plates of the Cuttlefish, *Sepia officinalis*, that we get the first traces of a true internal skeleton. On the threshold of the Fifth Division (*Vertebrata*) stands the Lancelot, *Amphioxus lanceolatus*, a little creature scarce two inches in length, the most anomalous and extraordinary of all living things, "a vertebrated animal without a brain, a fish with the respiratory system of a mollusk, and the circulatory system almost of an annelid." One step higher, eyeless, and with only the merest apology for fins, yet one of the most murderous and terrible of all parasites, stands the Hag-fish, or Borer, *Myxine glutinosa*, the lowest of the order *Cyclostomata* (circle-mouthed) to which our friends the Lampreys and Lamperns, *Petromyzonidæ* (stone-suckers), belong. In the latter, the cranium exhibits a soft cartilaginous texture, while the spine consists of a still softer cartilaginous stem, which passes along the entire length of the body; but the only indications of distinct vertebræ exist in the presence of slight and almost imperceptible rings of osseous substance and delicate intervertebral markings distinguishable upon the surface of the stem, and in vertical section (as at *h*, fig. 115).

A thin section of the *Chorda dorsalis* (fig. 111) shows it to consist of large polygonal cells; some parts of the chorda, especially those near the centre, are soft and pulpy: in these the cells can be

separated from each other, but nearer the circumference they are more compressed and very firmly adherent; from the looser textures nucleated cells (fig. 112) may be selected, which bear a remarkable resemblance to the cellular tissue of plants.

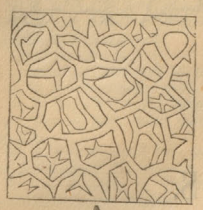


Fig. 111. Hexagonal cells, × 250; from the chorda dorsalis of *Petromyzon marinus*.

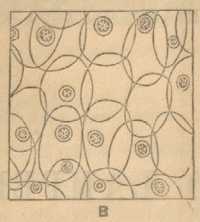


Fig. 112. Nucleated Cartilage cells, × 250; from the chorda dorsalis of *Petromyzon marinus*.

The order *Cyclostomata*, according to Dr. Gray, have the "gills saccate, body elongate, pectoral and ventral fins none;" and the family *Petromyzonidæ* (in contradistinction to the *Myxinidæ*) have the "nasal aperture closed, and the palate entirely covered with skin." The generic characteristics of the Lamprey, *Petromyzon marinus*, often called the Sea-Lamprey, and by Cuvier *la grande Lamproie*, are thus defined by Yarrell: "Body smooth, elongated, cylindrical like that of an eel; the head rounded, the mouth circular, armed with hard tooth-like processes, the lip forming a continuous circle round the mouth; seven apertures on each side of the neck, leading to seven branchial cells; no pectoral or ventral fins; the skin towards the tail extending in a fold from the body both above and below, forms dorsal and caudal fins," to which may be added that both dorsal fins are convex, that the first dorsal fin is placed behind the middle of the body, and is lower and shorter than the second; the second appears at first sight to be directly continuous with the caudal, but the true anatomical limit of the former is indicated by a deep notch, and on close examination it will be seen that the posterior extremity of the dorsal is superimposed over the first rays of the caudal, while a kind of crease is observable in the skin, running from the notch forwards in an oblique direction below the dorsal: from the notch the true caudal fin extends backwards, surrounding the tail; having reached the inferior aspect, it gradually loses itself in the skin of the abdomen without constituting a true anal fin.

The skin is perfectly smooth; the colour of the body is olive-brown, mottled and spotted on the back and sides with darker green and dark brown —hence it is sometimes called *P. maculatus*,—the margins of the fins inclining to reddish brown; but these colours seem to vary, being modified probably by local conditions. Of two fine specimens received from the Severn within the last fortnight, the one abounded in golden tints, while the spots were almost blue.

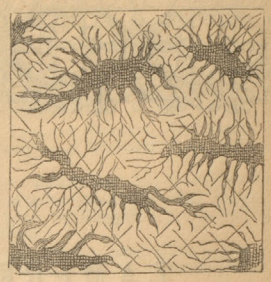


Fig. 113. Pigment-cells, × 250, from the skin of *P. marinus*.

The head has a somewhat elongated appearance when the mouth is closed; the latter is generally spoken of as a longitudinal slit on the under side, but it is rather buttonhole-shaped, with a remarkable commissural fold admitting of great expansion at the posterior angle; the lips are soft and tumescent; when the mouth is opened wide, it becomes, as Mr. Couch aptly describes it, "circular and terminal, so that the fish appears as if the head had been cut off;" it forms a most efficient suctorial apparatus; the flexible cartilaginous rim representing the jaws adapts itself to the form of the surface to which the mouth is applied, and on the motile piston-like tongue being retracted a vacuum is formed, and a hold of extraordinary power is obtained. By means of this mechanism, the various genera of the family *Petromyzonidæ* affix themselves to the rocks and stones at the bottom when in a state of repose. I have seen the bed of the Severn, in certain favourite spots between Gloucester and Tewkesbury, literally black with thousands of "stone-suckers;" safely moored by the head, with their tails floating free, swaying from side to side in the swift current of the deep dark river, they looked so like the waving tangle of the waterweed, that they would certainly have escaped the observation of any person who was not specially bent upon discovering them. In still waters they swim with a lateral undulating motion, but in rapid streams they advance by a succession of plunges, fastening themselves at the end of each spot to any convenient object.

The armament of the mouth renders it a most formidable weapon of offence. This peculiar dental apparatus is thus described in Owen's "Odontography":—

"In the Lampreys there are labial and maxillary as well as palatal and lingual teeth; all these are horny substances of a simple, conical, sharp-pointed form; they are hollow and supported on conical reproductive pulps. The pulps of the teeth are firmly attached by their base to the fibrous tissue of the lining membrane of the lip. The labial teeth of the outer or marginal circle are the smallest; from these the teeth increase in size as they ap-

proach the centre of the cavity of the mouth. The converging series in the mesial plane are arranged in a straight line, those of the sides in curved lines with the concavity towards the lower margin of the mouth; in *P. marinus* the innermost teeth of four of the lateral series on each side are bicuspid, or consist each of two cones which are confluent at the base; there are twenty converging rows of teeth in this species, and from four to eight teeth in each row. The single tooth supported by the palatal cartilage consists of two horny cones placed in the transverse direction, and joined (in *P. marinus*) in the median line; but in the Lampern (*P. fluviatilis*) the cones are more remote. The matrix of this tooth is hollow at the base, and is supported on a conical process of the palatal cartilage, which Cuvier describes as the upper jaw. The broad bicuspid palatal tooth is opposed by the dentated, semilunar, horny plate with which the cartilage representing the lower jaw is sheathed. This plate consists of eight conical teeth, laterally united together. The lingual teeth consist of three dentated horny plates, the dentations being much smaller than in the palatal or mandibular plates."

It has been asserted that when the Lamprey attacks a fish, it first drives the large palatal tooth into the flesh of its living prey, and holds on thereby as by a grappling-iron, while it applies its suctorial mouth gradually in a leisurely manner. Now this palatal tooth being the farthest back in the creature's mouth, almost at the entrance of the throat, cannot by any possibility be the first to reach the side of the fish attacked, nor is it of sufficient size and strength or sufficiently recurved to be capable of performing this special office: the edges of the lips are of necessity (as any one may assure himself by experiment) first brought in contact with the surface to which the animal wishes to affix itself; the tongue is probably retracted instantaneously and a vacuum formed. The hold secured by such means must be very powerful. Some of our young friends may amuse themselves by calculating the atmospheric pressure on the external surface of a sucking disc two and a half inches in diameter, which will give them some idea of the power of adhesion possessed by the Lamprey, even supposing that the teeth are not brought into play at all. There can be little doubt that the Lamprey can fasten itself as instantaneously to the side of a fish, as we know it does to a stone or to the bottom of a boat by means of its lips; how the teeth act after the lips are glued to the prey, must be very much a matter of conjecture, as they are then altogether invisible; whether the trephine-like saws of the tongue which seems capable of turning every way, or the entire armature of the mouth is used, no one can tell with certainty; but we know that by some process of sawing, rasping, and grinding, the fierce pirate (without inflicting mortal injuries) contrives to tear away and swallow mouthfuls of mashed-up flesh like forced-meat balls, from the bones of its hapless and vainly struggling victim, releasing it after the cannibal meal is over. Fish which have had toll thus levied on them are often caught, apparently not much the worse for the operation.

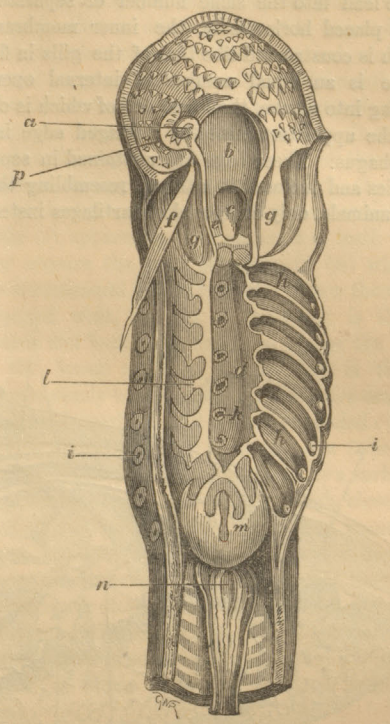


Fig. 114. Respiratory Apparatus of the Lamprey, one-third of the natural size.

In this figure, which is reduced from a plate by Sir Everard Home in "Philosophical Transactions," (*a*) represents the tongue, which with the dentated semilunar plate (*p*) is turned on one side; (*b*) the cavity of the mouth; (*c*) the fauces; (*d*) the branchial channel or tube into which the gill-chambers open; (*e*) the termination of the same channel in a so-called "loose-edge" (?) at the origin of the œsophagus; (*f*) a firm cartilage in the centre of the retractory muscle of the tongue; (*g, g*) two large salivary glands; (*h, h*) the cavities containing a structure like gills, laid open through their whole extent; (*i, i*) external orifices of the gill-cavities; (*k, k*) their internal orifices opening into the branchial tube; (*l, l*) cartilages of the thorax; (*m*) the cartilaginous case containing the heart (according to Owen, "the pericardium is a shut sac, supported by a perforated case of cartilage formed by the last pair of modified branchial arches"); (*n*) termination of the œsophagus in the stomach. The process of respiration is thus briefly described by the writer from whose monograph the preceding

illustration (Fig. 114) is taken. I scarcely need premise, that water is supplied to the gills through the mouth as in other fishes, when the creature is not adhering to any foreign body by its mouth.

"In the *Lamprey* the organs of respiration have seven external openings on each side of the animal; these lead into the same number of separate oval bags placed horizontally, the inner membrane of which is constructed like that of the gills in fishes. There is an equal number of internal openings leading into a tube, the lower end of which is closed and the upper terminates by a fringed edge in the œsophagus. These bags are contained in separate cavities and inclosed in a thorax resembling that of land animals, only composed of cartilages instead of up the cartilages and the pericardium. In the *Lampern* the arrangements are the same, only the cartilages of the thorax are so weak as to appear like ligaments, and the pericardium is membranous."

Some further details are given by Yarrell:—"When the Lamprey is firmly attached, as is commonly the case, to foreign bodies, by means of its suctorial mouth, it is obvious that no water can pass by that aperture from the pharynx to the gills; it is therefore alternately received and expelled by the external apertures. If a Lamprey while so attached to the side of a vessel, be held with one series of apertures out of the water, the respiratory currents are seen to enter by the submerged orifices, and after

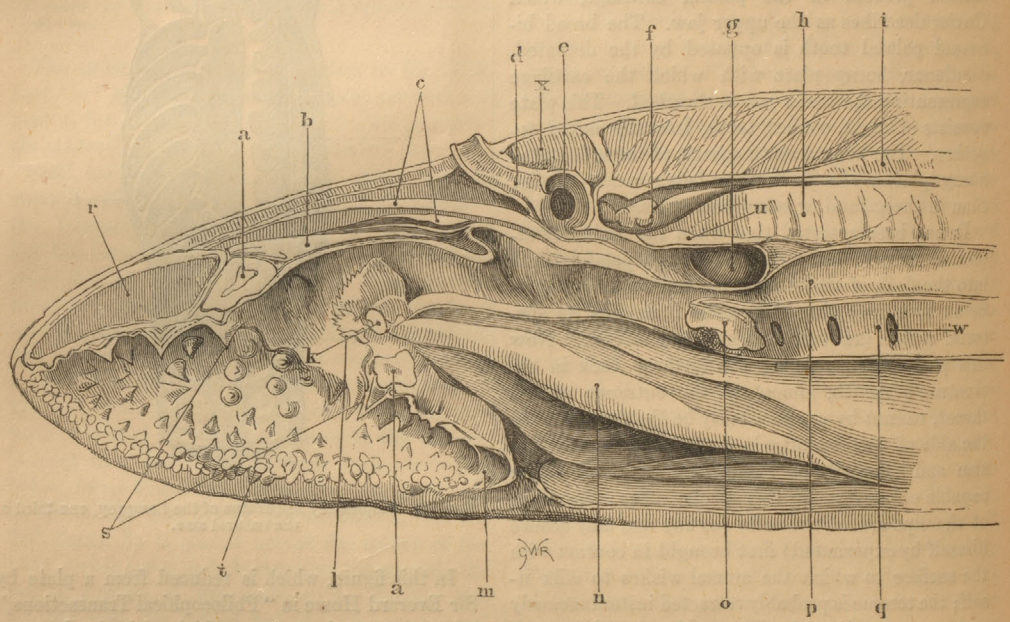


Fig. 115. Vertical section of the Head of the Lamprey (*Petromyzon marinus*), natural size.
J. D. McDonald, M.D., F.R.S., *ad Nat. delt.*, May, 1869.

ribs, and the pericardium, which is also cartilaginous, is fitted to its lower extremity like a diaphragm. The water is received by the seven lateral openings on each side of the animal into the bags which perform the office of gills, and passes out by the same orifices. The form of the cavities being fitted to allow the water to go in at one side, pass round the projecting parts, and out at the other. A part of the water escapes into the middle tube, and from thence either passes into the other bags, or out into the œsophagus (?) There is a common belief that the water is thrown out of the nostril; this, however, is unfounded, as the nostril has no communication with the mouth. The elasticity of the cartilages of the thorax admits of the water being received, and it is expelled by the action of the muscles drawing traversing the corresponding sacs and pharynx, to pass through the opposite branchiæ, and to be forcibly ejected therefrom by the exposed orifices." The wording of this passage might lead one to suppose that the water received by the apertures of the right side was invariably expelled by those of the left, and *vice versâ;* but this is not the case; the water may be supplied to the left side from the right, if the animal is forcibly retained in an unnatural position, and it will be expelled partly by the apertures held above water, but also by the submerged apertures [by which it first entered; there is no such crossing of currents as the text seems to imply. I must venture, in all humility, to take exception to Sir Everard's statement, that the water which has passed from the gill-chambers into

the central branchial tube escapes by the œsophagus, inasmuch as careful dissections made by a skilled anatomist within the last few days in my presence, disclosed two cartilaginous epiglottidian valves (*o*, Fig. 115) guarding the upper extremity of this central respiratory channel and effectually preventing regurgitation; when the gill-chambers and the said channel were injected through the external openings, the water with which the whole respiratory system was fully distended could not be forced out into the mouth. The central tube, which is of a flattened form, having its vertical diameter the greater, appears to be a pump used both for sucking water in and to aid in forcing it out.

Although Cuvier had declared that the popular belief that water passed through the nostril into the branchial channel was unfounded, and Sir Everard Home in more recent times had shown the supposition to be erroneous, while Huxley in our own day speaks of the olfactory passage as ending in a *cæcum* or blind sac, we still find the old mistaken notion perpetually reproduced. A writer of note, for example, tells us "there is another remarkable arrangement in the Lampreys: this consists in the presence of a small tubular orifice situated in the middle of the back of the head just in front of the eyes, which leads downwards into the pharynx, into which it opens by the orifice (*c*, Fig. 114), so that water can enter this passage while the mouth is kept immovably fixed to the surface whereunto the Lamprey has attached itself"; another has actually made "an aperture on the top of the head communicating with the gills," one of his characteristics of the *Petromyzonidæ*, in defiance of all previous testimony; it is in the *Myxinoid* fishes, and not in the *Petromyzonidæ*, that this aperture communicates with the gills; this difference of construction constituting one of the generic distinctions between them. The Beræans of old were held to be more noble than the men of Thessalonica because they searched to see for themselves "if these things were so," an example which all students, especially students of Natural History, will do well to follow.

Notwithstanding the preponderating mass of evidence in proof of the nasal tube having nothing whatever to do with conveying water to the breathing apparatus, it was chiefly to satisfy ourselves on this particular point that a number of special dissections were undertaken. The nostril is not correctly described as "an aperture" merely; a stiff tube of the size and somewhat the appearance of a goose-quill projects above the general surface just in front of the eyes; before the knife was taken in hand, the blowpipe first, and then injections, were used to ascertain if the olfactory orifice ended in a true *cæcum*, or possessed any valve or outlet of any description communicating with the mouth pharynx or branchial chamber; the results, as well as the revelations of the scalpel, proved to demonstration that the nostril ends posteriorly in an imperforate *cæcum*, and has nothing on earth to do with the respiratory system.

In Fig. 115 (*a*, *a*) show the vertical sections of the oral ring; (*b* and *c*) are cartilaginous plates, attached by muscles and ligaments hanging in loose folds when the mouth is closed, the plates sliding over each other to admit of the wide expansion of the mouth when opened out in a vertical circle for suctorial purposes: one complete lip (the right) and border of the mouth is shown in the natural position it rests in when the mouth is closed. It may be traced in the engraving from the tip of the snout, its margin folding slightly over inwards, the inner edge of the lip bearing a zone of three rows of soft papillæ (*l*), apparently the rudiments of teeth which never acquire the hard covering, to (*m*) where a deep commissural fold is formed. When the mouth is opened wide, the tip of the snout is thrown upwards and backwards nearly as far as the point (*b*), the lower angle of the lip (*m*) is thrown forwards nearly to the point (*l*), the entire oral ring is thus made vertical, and widely expanded: it can easily be understood how after the lips (when the mouth is in this position) are applied to a surface, if the powerful piston-like tongue which closes the throat be drawn backwards, a complete vacuum is formed in the cavity of the mouth, and it does not surprise one to hear that Lampreys after they have paired remove stones from the bed of their spawning places, and when dragged out of the water, tail foremost, have in some instances brought with them a block of stone twelve or fourteen pounds in weight.

The soft fibrous basis of the lip is shown in section at (*r*); (*a*) marks the hard cartilage of the oral ring; (*b* and *c*) show the imbricated plates sometimes spoken of collectively as "the hard palate," the larger plate of the two denoted by (*c*) is the "ethmo-vomerine plate" of Huxley: next comes the much talked of nasal orifice, which appears to be unprovided with any valve or guard to prevent foreign bodies from entering the passage (*d*) which leads into the olfactory capsule (*e*), the seat of the sense, which is lined with a black pigment, and supplied with nerves spreading over its surface.

"Between the basi-occipital plate of cartilage and the hard palate there is an oval space through which the neck of the long olfactory *cæcum* passes; this *cæcum* therefore separates the front part of the floor of the cranial cavity, which is simply membranous, from the so-called hard-palate"; the constricted "neck" is clearly shown in our figure, and the entire canal can be traced by the reader from the inlet to the *fundus* of the blind bag (*g*). The use of this narrow-necked canal with its wide dilatable pouch (*g*) is sufficiently evident. The external orifice of the olfactory tube being

unguarded, water flows in and fills the chamber of the capsule (*e*) by the simple action of gravity; this water bringing with it foreign bodies, could never be expelled or changed, but for the contractile muscular pouch lying below. When this is compressed by the will of the animal, the water it contains is forced out in a strong jet through the narrow neck and literally syringes out the smelling-chamber and upper tube. The Lamprey is thus enabled "*se emungere*," and to change the water as often or as seldom as it pleases, with quick successive sniffs when smelling about for food, and at longer intervals when in a state of rest. The fact that "currents of water have been observed to enter the nasal orifice" may perhaps have led some people to jump to the erroneous conclusion that they *must* have been passing to the gills.

At (*f*) we see the brain enclosed in the remarkably small cranium, "the proper cranium, which is a kind of cartilaginous box, closed in front, and through the greater part of its roof, only by membrane, but complete behind, where it arches over the myelon and is perforated by the occipital foramen." At (*h*) we see the intervertebral markings of the chorda dorsalis, and at (*i*) the rudimentary spinous processes; at (*k*) the transverse cartilage of the tongue; at (*l*) the anterior piston-like portion of the tongue with the teeth of its nearly circular saws; (*m*) marks the soft commissure of the lip; (*n*) the elongated lingual cartilage, which performs the part of a piston-rod; (*o*) the right epiglottidian cartilaginous valve closing the anterior orifice of the branchial channel and preventing the regurgitation of water through the mouth; (*q*) the central respiratory chamber or branchial channel, in which three of the internal openings (*w*) of the gill-chambers are seen; (*r*) soft fibrous basis of the lip in section; (*s*) principal teeth in connection with the oral ring; (*t*) zone of mucous papillæ just within the margin of the lip; (*u*) basi-occipital plate; immediately behind the nasal tube and above the olfactory capsule is a reddish fibrous and elastic mass (*x*) apparently glandular, of the size of a hazel-nut; the external skin above this body is thinned, devoid of pigment, and perforated by a minute orifice.

The specimen from which this drawing was taken measured thirty-four inches in length, and eight inches round the thickest part of the body over the gill-openings. The largest specimen seen in Gloucester within the last fifty years is said to have measured thirty-nine inches.

When Lampreys were in fashion, they fetched about ten shillings each in the early part of the season, *i. e.* in May; but they are no longer the rage, and are sold at about the average market price of common eels. I paid only half a crown for each of mine, and they were very fine, weighing over four pounds apiece. They are usually taken in the salmon nets, and are in season from the middle of April until the middle of June, after which time they return to the sea. The fishermen have an opinion that all the Lampreys they catch are invariably one year old. There seems to be no ground for such a conclusion; from the great variety in size and weight—from one to four pounds—we may suppose that their ages differ considerably and that the larger specimens are probably several years old.

The Lamprey, ugly fellow though he is, has had his praises sung in Latin verse; there is a scholarly account of his classical history in an article by Mr. Couch in vol. ii. of the "Intellectual Observer."

We appear to have but one species of Lamprey in England; there is another found in France: there are four American varieties, and a hideous monster "the Pouched Lamprey of Australia."

The pouch is said to be a provision of nature for enabling the creature to store a supply of water to enable it to endure the long droughts which often dry up the streams it frequents, when it burrows in the mud and remains in a semitorpid condition until the return of the rains.

This pouch exists in a rudimentary state in our *P. marinus;* but as the latter is not subjected to the same vicissitudes as its Antipodean representative, nature suppresses the development of an appendage which would only be a useless incumbrance to it.

The so-called "Mud Lamprey," or "Sand Pride," is not a true Lamprey, *Petromyzon;* it does not possess the power of adhering to foreign bodies by the mouth, and properly belongs to the genus *Ammocætes:* it is the *Lamprillon* of Cuvier.

I have but little space left for the Lampern, *Petromyzon* (*vel Lampetra*) *fluviatilis*, the River Lamprey, as it is sometimes called; *la petite Lamproie* of Cuvier. In structure as well as in its habits it closely resembles its larger congener, but is only from seven to ten inches in length, and from an inch to an inch and a half in circumference, and weighs about a couple of ounces. The skin is quite smooth, of a blue colour on the back and sides, *maculis carens*, without the mottled spots of *P. marinus*, passing into a silvery white underneath. The armature of the mouth differs very materially from that of the larger genus. "*Lampetra fluviatilis*, upper and lower teeth transverse, crescent-shaped; labial teeth in two submarginal rows; inner lateral teeth larger, two- or three-lobed; lingual teeth pectinate." This fish is found in abundance in British rivers; it is caught from July to March in baskets called "Lampern putchers," and sold by the hundred at a very low price: it is chiefly used for bait for sea-fishing.

The Fringe-lipped Lampern, *Petromyzon Planeri*, is shorter and thicker than *P. fluviatilis;* it is found chiefly in the Scotch rivers; it seems to be unknown in the Severn. The teeth are somewhat differently disposed, but it is chiefly distinguished

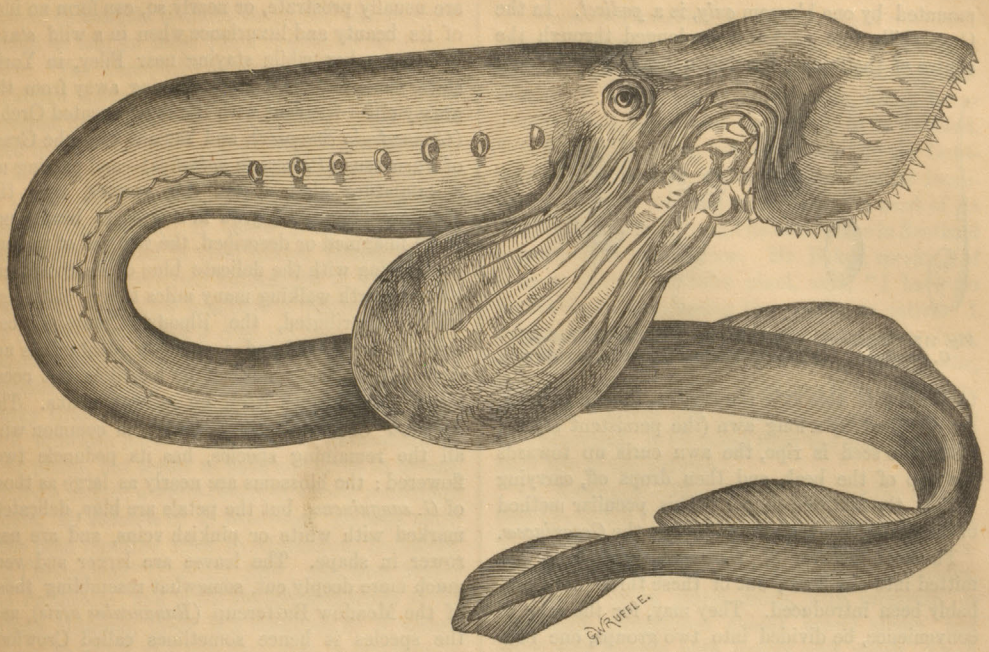


Fig. 116. The Pouched Lamprey, *Geotria Australis*.

from the other by "the whole of the broad edge of the circular lip being furnished with numerous papillæ forming a thickly-set fringe, and by the depth and close connection of the two dorsal fins."

There are other varieties in other parts of the world; but bearing in mind the effect of an over-indulgence in the *Petromyzonidæ* upon poor King Henry the First, I am anxious not to overdose the reader.

"One day when he had acquired a fresh appetite by chasing the deer in the woods of Lions-la-forêt, he partook largely of his favourite food, consisting of stewed lampreys; and the ruler of England and Normandy, the supplanter of his brother, the destroyer of his nephew, the father-in-law of an emperor, and ancestor of many kings, died by over-eating himself at supper."

Bury Cross, Gosport.

CRANESBILLS.

AS there are always those who "take their walks abroad" with eyes shut to the beauties and marvels so lavishly displayed around them, so it is only natural to suppose that there are also those who have never noticed our wild Cranesbills—to whom even their name is new. If we speak to them of Geraniums, however, they will possibly understand a little what we mean; and will, perhaps, with the vision of scarlet "Tom Thumbs" before their eyes, roundly assert that we have no wild Geraniums, or that, if we have, they must be exceedingly rare, and seldom met with. Tell them that Geraniums are scattered through the length and breadth of the land—by streams and roadsides, in woods, hedges, and fields, and even on walls and housetops—and they will haply think you slightly insane, and hint solemnly at Dr. Forbes Winslow.

Besides this class of persons, who neither know nor care to know anything about our wild flowers, there is another and happily a larger class, who, if ignorant, have no wish to remain so; and as a large proportion of these read SCIENCE-GOSSIP, we will endeavour to introduce to their notice our British *Gerania*, or Cranesbills.

As among men there is frequently a resemblance between members of the same family, so is there a family likeness among the Cranesbills. We will first enumerate the points which are common to all our British species. Their blossoms are composed of five petals, of equal size, notched or entire, which are usually of some shade of red, but occasionally blue; each blossom contains ten stamens, which are united at their base; thus placing the genus in the Linnæan class *Monadelphia* (one-brotherhood), order *Decandria*. *G. pusillum* is the only exception to this rule, having only five anther-bearing stamens. Again, the flowers grow on long peduncles, each peduncle, having (in all the species but one) two pedicels surmounted each by one blossom. Just a word in passing on these two somewhat similar terms. A *peduncle* is a stalk branching off from the main stem of a plant, and bearing two or more flowers, each on a stalk of its own; this latter, sur-

mounted by one blossom *only*, is a *pedicel*. In the Cranesbills, this pedicel is prolonged through the centre of the flower, forming a beak, or *axis;* and

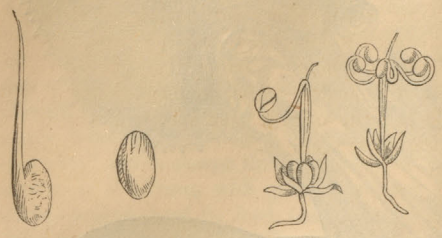


Fig. 117. Carpels of *G. pusillum*.

Fig. 118. *Geranium rotundifolium*, showing the carpels adhering to the axis.

to the top of this axis the carpels, five in number, are attached by a long awn (the persistent style); when the seed is ripe, the awn curls up towards the top of the beak, and then drops off, carrying with it the matured carpel. This peculiar method of dispersing the seed is confined to the *Geraniaceæ*.

Fourteen species of *Geranium* have been admitted into our flora; but of these three have probably been introduced. They may, for the sake of convenience, be divided into two groups, one containing the perennial, the other the annual species. An ingenious writer once observed that "seeds may be divided into four kinds, according to their size; viz., large, middle-sized, small, and minute;" and our division of the Cranesbills may appear to favour this simple style of classification: as our first group, the perennials, contains the seven larger species, while the remaining seven, forming the annual group, are smaller and less conspicuous, although more widely distributed.

I. PERENNIALS.—Six out of the seven species of this division are characterized by a short thick rhizome, or underground stem, from which the roots spring. The Bloody Cranesbill (*Geranium sanguineum*) may be at once distinguished by its *one-flowered* peduncle. A handsome species indeed it is, and one which is often welcomed as a border visitor. Many branches spring from one root; the general outline of the leaves (which grow in pairs) is round, but each is divided into six or seven lobes, and these again are deeply cut: both leaves and stems are very hairy and soft. The flowers are very handsome, of a glowing purplish-red, and about the size of a florin in circumference. A white-flowered variety has been observed by Mr. J. C. Melvill, at Silverdale, in Yorkshire, which approached in habit *G. lancastriense* (a form of this species, found at Walney Island, Lancashire, having white flowers veined with pink, which retains this peculiarity under cultivation). Mr. Melvill also mentions a small form of *G. sanguineum* having notched petals, which he noticed on serpentine at the Lizard, Cornwall. Those who have only seen the Bloody Cranesbill in gardens, where its stems are usually prostrate, or nearly so, can form no idea of its beauty and luxuriance when in a wild state. We remember, while staying near Filey, in Yorkshire, some few years since, turning away from the grassy cliff—fragrant with the sweet-scented Orchis (*Gymnadenia conopsea*), and radiant with the Grass of Parnassus (*Parnassia palustris*)—and passing up a miniature glen, where this species, with the Meadow Cranesbill, grew in masses, in beauty not to be imagined or described, the rich red of the one contrasting with the delicate blue of its congener: a sight worth walking many miles to see. Although widely distributed, the Bloody Cranesbill can scarcely be considered a common plant; it is undoubtedly native in most of its localities, but occasionally establishes itself on railway banks. The Meadow Cranesbill (*G. pratense*), in common with all the remaining species, has its peduncle two-flowered: the blossoms are nearly as large as those of *G. sanguineum*, but the petals are blue, delicately marked with white or pinkish veins, and are narrower in shape. The leaves are larger and very much more deeply cut, somewhat resembling those of the Meadow Buttercup (*Ranunculus acris*), and the species is hence sometimes called Crowfoot Cranesbill. As its name implies, this Cranesbill is an inhabitant of pastures, but it is by no means confined to such situations: we may usually find it in the nature-garden with which the banks of the Thames and other rivers are fringed; nor is it unfrequent in lanes, preferring, though not absolutely requiring, a damp locality. The plant is usually erect in habit, about two feet in height; its blossoms expand from May until August, becoming smaller towards the close of the summer; it is generally distributed, and is not unfrequent in gardens. The *blue* flowers at once distinguish it. With the Wood Cranesbill (*G. sylvaticum*) we have never had the good fortune to meet, so our description of it must be gleaned from the works of more favoured observers. Mr. Bentham thus describes it:—"Stem erect or ascending, one to two feet high, or rather more. Radical leaves on long stalks, palmately divided almost to the base with five or seven pointed lobes more or less cut or serrated. Stem leaves few, on much shorter stalks. The upper part of the stem is repeatedly forked, forming a rather dense corymbose panicle of handsome purplish flowers." Judging from dried specimens, this species retains its colour more satisfactorily than most of the Cranesbills. It is more northerly in its distribution than any other of our species; Mr. Watson says that its "chief prevalence appears to run from Yorkshire into the Highlands; southward, it reappears in Shropshire, Worcestershire, Warwickshire, and Norfolk," and the last three counties form its southern limit; for although more southerly stations have been recorded, some mistake is suspected.

The nativity of this first instalment of the rhizo-

matous Cranesbills is above suspicion; but as much cannot be said for those which remain for us to consider. The Pencilled Geranium (*G. striatum*), or "Painted Lady," as it is sometimes called, is so common in gardens where everything is not sacrificed to the "bedding" system, that it can need but little description; the flowers are somewhat vaselike in shape, white, and most delicately striped with pink or lilac veins. It seems possible that this species may be wild in the Channel Islands, and it is said to be at any rate naturalized in Devon and Cornwall; many other localities in different counties are recorded for it, but it does not appear to be permanently established in any save in those we have specified. Another common garden species, the Dusky Cranesbill (*G. phæum*), known by its very dark brownish-purple blossoms, is naturalized in some places, but seems to have no claims to be considered a native: a white-flowered variety sometimes occurs. *G. nodosum* or *G. angulatum* (perhaps both) "has been reported from Hertfordshire, Yorkshire, and Cumberland" (*Cybele*, i. 259); also from Surrey and Perthshire; and in the British herbarium at the British Museum, there is a specimen of *G. macrorhizum*, to which the following note is attached:—"Growing in great abundance on walls at the North Hall, called by the common people Valery Ann; Rev. Aaron Neck, St. Mary Church, Newton Abbot, Devon, Sept. 3, 1803."

The Mountain Cranesbill (*G. pyrenaïcum*) may be regarded as a connecting link between the perennial and the annual species. Although much larger in all its parts than any of the latter, its root-leaves bear considerable resemblance to those of *G. molle*; indeed, in a young state, the plants are liable to be confused, as the root-leaves of *G. molle* often attain a very large size. It may be owing to this resemblance that we find no reference to *G. pyrenaïcum* in Ray's "Synopsis," although Hudson had previously mentioned it: Curtis, too, united it with *G. molle*. It may be distinguished from all the preceding by the absence of a rhizome, the root being long and tapering. When the flowering-stems of this Cranesbill first shoot up above the leaves, the buds appear to grow in a dense head; but as the stems elongate and the blossoms develop, we see that the former are branched, the branches proceeding from the axils of the leaves. From the same axil both a flowering branch and a two-flowered peduncle often proceed; and these axillary stems are again branched, so that the plant, when in full flower, presents a somewhat straggling and untidy appearance. The stem-leaves are more deeply cleft than those proceeding from the root, and the upper are nearly sessile; the flowers are about as large round as a fourpenny piece, with deeply-notched petals of a peculiar bluish-purple, slightly tinged with red, which we have never seen accurately rendered in any plate of the plant. Although called the *Mountain* Cranesbill, it is by no means restricted to elevated situations; we find it by roadsides, often so covered with dust as to be almost undistinguishable, or in waste places near houses, which latter circumstance has caused its nativity to be doubted. We have little doubt, however, that, like the Goutweed and Celandine, which frequent similar localities, it is really an indigenous species in most of its English habitats, although its occurrence in Scotland is more liable to suspicion. Mr. Baker, speaking of it as a North Yorkshire plant, says, "I have no hesitation in considering the species as native. I have not seen it within our limits as a garden plant, and it grows upon hedgebanks like *pusillum*, *molle*, and *columbinum*." In the neighbourhood of London, as about Chelsea and Brompton, *G. pyrenaïcum* is very abundant; it blossoms from the middle of May until late in the autumn.

II. Annuals.—We will first consider the Dove's-foot Cranesbill (*G. molle*), the resemblance of which to the Mountain Cranesbill has already been mentioned. This is a soft plant, growing by roadsides, on banks, or in clover fields, with prostrate, or ascending (sometimes almost erect) stems, and small pink flowers, with deeply cleft petals, which do not become of so blue a tint when fading as those of *G. pyrenaicum*. The Dove's-foot is, however, a much smaller plant than the Mountain Cranesbill, and the stems, even when nearly erect, are much weaker than those of that species: the leaves, too, are usually of a lighter green. Pale-flowered forms are common, and a white one is not unfrequent: near the village of Lake, in the Isle of Wight, is a bank covered for some considerable distance with this latter variety. The Small-flowered Cranesbill (*G. pusillum*) grows in the same situations as *G. molle*, but is much less common; it is often passed over in mistake for the Dove's-foot, although a little examination will discover important points of difference between them. The leaves of *G. pusillum* are more deeply cut (the upper often to their base); and the segments of the rootleaves sometimes do not touch, and, as far as our investigation goes, never overlap, as do those of *G. molle*. The petals, although notched, are not bifid as in *G. molle*, and the flowers are smaller, and not so pink. It is difficult to describe satisfactorily the differences in colour of the flowers of some of our Cranesbills; but any one acquainted with the plants will notice that there are such differences, although a verbal description may be inadequate to present them properly to the reader. The corolla is not so flat as that of *G. molle*, and five of the stamens are abortive, being without anthers: this is one of the most distinctive marks of *G. pusillum*, which in this particular approaches the Storksbills (*Erodium*). One may occasionally find the anthers defective in other species; but with them it is the exception, while in

G. pusillum it is the rule. Again, the carpels of *G. molle* and *G. pusillum* are remarkably unlike, as the accompanying figures (from "English Botany") will show; in the former they are "transversely wrinkled with prominent ridges," and glabrous (fig. 119)'; in the latter "without transverse wrinkles," and "downy, with short hairs" (fig. 117). The

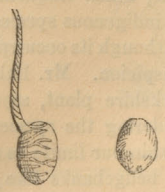


Fig. 119. Carpels of *G. molle*.

Small-flowered Cranesbill is more straggling and untidy-looking than *G. molle:* its stems are weaker, and less hairy: both species flower from spring until late autumn. Dr. Bromfield* says of *G. molle:* "The herbage has a perceptible musky fragrance on a warm day, in addition to its usual rather strong odour, which is retained for some time after the plant is gathered;" while *G. pusillum* is destitute of this fragrance.

The Round-leaved Cranesbill (*G. rotundifolium*) is sometimes a tall plant, with erect, soft stems, and roundish leaves covered with whitish hairs, by which it is rendered conspicuous at some little distance. At other times, however, it resembles *G. molle* in habit, and has many, much-branched, ascending stems proceeding from the root. A single glance at the flowers will at once determine this species; they are pale pinkish-white, or sometimes rose-coloured, and the petals are *entire*. The specific name, *rotundifolium*, is, perhaps, scarcely appropriate, as, although the general outline of the leaves is round, they are not entire, although the earlier ones are less divided than the rest. Young botanists often mistake immature plants of *G. molle* for this species; the root-leaves of both being round. Those who do not know *G. rotundifolium* will therefore do well to wait until their supposed specimens are in blossom, before they announce their discovery, as there can then be no danger of mistake; and a few inaccurate statements of this description seriously detract from the botanical reputation of those who make them. The peduncles are shorter than in most of the species: they are usually described as two-flowered, but specimens which we collected at Oxford three-years since were, in several instances, three flowered. In one specimen, three flowers proceeded from the same base; in two or three others, one blossom was below the other two: the accompanying figures, drawn from these specimens, will illustrate this peculiarity, which, as far as our own observation goes, is confined to this species (fig. 120).

* "Flora Vectensis."

Both two-flowered and three-flowered peduncles occurred on the same plants. In specimens since received from Cornwall and Wiltshire, the peduncles are invariably two-flowered. *G. rotundifolium* is the rarest of our Cranesbills. Mr. Watson gives Gloucestershire and Suffolk as its northern limit as a native plant, regarding its occurrence farther north as having been erroneously recorded, or as an introduction with ballast; in the south of England it is more frequent, but can scarcely be called common.

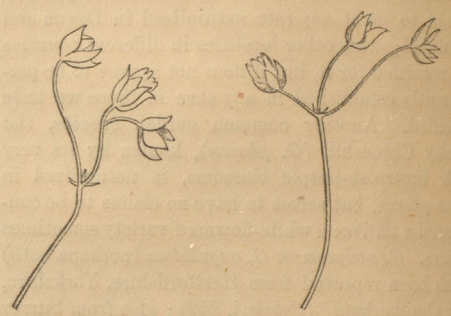


Fig. 120. Abnormal peduncles of *G. rotundifolium*.

Perhaps the Long-stalked Cranesbill (*G. columbinum*) is the most elegant of our species, although it is difficult to give any one the preference. It has very deeply-cut leaves, divided to their base with pointed segments, often tipped with red: the root-leaves are on long stalks. When growing among clover, with which it is frequently introduced, it is decumbent, spreading along the ground, the peduncles ascending; but on hedgebanks it assumes a more luxuriant habit, and the slender stems are sometimes almost erect, at others spreading. The flowers are rather large, but not flat, as in some of the species; for the sepals have long awns, which equal or exceed the petals in length, and the blossom consequently assumes a bell or vase-shaped appearance. Its colour is not easy to describe; Mr. Syme calls it "purplish-rose," but this hardly characterizes it, although it is difficult to find a better term. Both leaves and flowers are on remarkably long stalks; in specimens now before us, the peduncles and pedicels each average two inches in length, some exceeding it; and these are in plants which have not yet attained their full growth. The flowers are less numerous than in the preceding species, and the petals, which are slightly notched, are very fugacious. Although widely distributed, the Long-stalked Cranesbill is by no means a common plant; it is most frequent in chalky districts. We may note that the species called by Gerarde *G. columbinum*, is that now known as *G. molle;* taking into consideration the received name, "Dove's-foot," of this plant, in conjunction with the French *Pied de Pigeon*, and the corresponding Dutch name given by Gerarde, it seems a pity that the specific appellation, *columbinum*, should have been transferred to the Long-stalked Cranesbill.

The Cut-leaved Cranesbill (as *G. dissectum* is called *par excellence*) is a common and very variable species. When it grows on the hedgebank we are attracted to it in April or May by the deeply-cut, usually rather hairy, root-leaves, which stand conspicuously forward on their long stalks: these leaves die off in the summer, and the stem becomes much branched. At the beginning of June this species is in perfection; the small rose-coloured flowers then appear, and the graceful root-leaves have not begun to wither; and a bank covered with it, such as we not unfrequently come across in some country lane, is very ornamental. The stem-leaves, which are much cut, and but slightly stalked, are opposite. Although a tall plant, it is (except in spring) one of the least conspicuous of the Cranesbills, the petals being small, not longer than the calyx, notched, and very fugacious; the flowers seldom expand fully, save in bright sunshine; the peduncles are shorter than the leaf-stalks, and the axillary blossoms are often concealed by the leaves above them: the carpels are not wrinkled. In some situations the plant assumes a procumbent habit, and in open places the root-leaves are on shorter stalks, and less conspicuous. The stem, though erect, is usually weak, varying in height from eight inches to two feet. The Cut-leaved Cranesbill is generally distributed, and blossoms from May until late in the season.

The Shining Cranesbill (*G. lucidum*) is a deservedly admired species, which often finds a place in the gardens of flower lovers. No stain, however, rests upon its character as a native plant: if the gardens have given the woods the Dusky Cranesbill, it is to the hedgebanks that they are indebted for this pretty little plant. The leaves are round in outline, with broad segments, and shining as if brushed over with gum; at the latter end of June they become bordered with red, sometimes red altogether: the stem is much branched, usually from the axils of a pair of leaves. When *G. lucidum* first flowers, the blossoms appear to lie close to the root, so imbedded are they in the dark shining leaves; but as the stem elongates and branches, the plant becomes straggling, and less ornamental than in the earlier stage. It is useful to grow with the Wood Scorpion-grass (*Myosotis sylvatica*), as both can be pulled up at the beginning of June to make room for summer plants; and both have by that time perfected and dispersed a sufficient quantity of seed to ensure a supply of each for the next spring. Or the plants, when pulled up, may be shaken over any spare bit of ground, and the produce of the seed thus scattered may be planted out the following spring in the beds where required. The calyx of *G. lucidum* is worth noticing; it is pyramidal, the edges of the sepals forming projecting angles. But it is only three of the sepals that are conspicuous; these are broad, transparent, and greenish-white; the other two are narrow and white, with a central green line. The petals are of a bright rose-pink, with a white claw, usually entire, but sometimes slightly notched; they contrast prettily with the pale yellow anthers. Although the flowers are small, they are conspicuous from their brightness and abundance. It is to be wished that, for garden growth, a form could be obtained in which the procumbent habit should be retained, and the blossoms increased in size and number: probably by careful selection such a result might be attained. The segments of the upper leaves are more pointed, and somewhat approach those of Herb Robert in appearance; the whole plant has, in a less degree, the scent of that species. Although not a rare, it is by no means a common plant: it prefers chalky districts, and usually grows on hedgebanks, covering large spaces; sometimes it may be found on roofs of cottages; and Withering says it is frequent among corn on a chalky soil, a habitat in which we have not detected it. Lastly, we may note the elasticity with which the carpels, when mature, spring from their axis: in *G. rotundifolium*, they adhere by their awns for some time, and even after the seed is dropped; but in *G. lucidum* they go off at a touch, almost as suddenly as those of the Wood-sorrel.

"There are worse things than the common weed, *G. Robertianum* for twining itself round the sides of a rustic basket, or crawling over a rockwork." This is the qualified praise which "The Cottage Gardener's Dictionary" condescends to bestow upon Herb Robert, one of the commonest, and one of the prettiest of our Cranesbills. Not only are there "worse things," but, in our humble opinion, there are few better for such purposes. Who, that has seen a stoneheap by the woodside, covered in April with the delicate fern-like foliage of this plant, the two bright red seed-leaves still adhering to the stem, can have passed such a natural rockwork by without an admiring glance?—or, later in the season when the stems become red, and the numerous pink flowers expand, who has not been struck with the elegance of its growth and the beauty of its colours? There are people who care for none of these things, but we would not be reckoned among them. It is hardly necessary to describe so well-known a plant: its elegant foliage and white-veined flowers are familiar to almost every one: so is its strong aromatic scent, which some, with Gerarde consider disagreeable, while others (ourselves among the number) think it pleasant. A variety with pure white flowers is cultivated in gardens, and sometimes occurs in a wild state; we have found it with but a faint tinge of pink at Capel Curig, North Wales: both these variations are permanent. The outline of the leaves is pentagonal, and the sepals are unequal, as in *G. lucidum*. We have before referred to the former use of this plant as a

styptic;* and it has been considered a specific for gout. It is generally distributed throughout the kingdom; but Mr. Watson tells us that at the village of Castletown, in Braemar, he "saw plants of this species potted and housed as 'geraniums,' with the care which English cottagers bestow upon pelargoniums."

Time will not permit us here to say much about our cultivated *Geraniaceæ;* but we may just remark in passing that both those used for bedding, and the various greenhouse species, are equally Pelargoniums; and those who distinguish the former as Geraniums and the latter as Pelargoniums, have no ground whatever for the distinction. A pretty variety of *G. Robertianum* (*G. purpureum*) grows on shingly seashores in the South of England; it has smaller leaves and flowers, and is more branched.

The Cranesbills do not appear to be particularly popular in the rustic mind, if we may judge from the fact that but few have local names. *G. phæum* is sometimes called "Mourning Widow;" *G. molle*, in South Bucks, is "Starlights;" and *G. lucidum* is called "Robins" in South Devon. Even *G. Robertianum* figures in but few of the lists we have received; but the number, variety, and we may add, incomprehensibility, of its names in our own district somewhat atones for this deficiency. They are as follow:—Bird's-eye (applied to many other flowers); Cuckoos (generic for spring flowers); Cuckoo's-eye; Cuckoo's "Vittles" (the usual name for Wood-sorrel); Stinking Bob (in allusion to its odour, and its name, Herb Robert); Ragged Robin; Billy Button; Sailor's Knot; Nightingales (from flowering about their time of singing?); Soldiers' Buttons; Garden Gate (a common name for *Viola tricolor*); and Knife and Fork (in allusion to the two-flowered peduncle). In Sussex it is Stinking Bob; in Cambridgeshire, Red Robin; in Gloucestershire, London Pride; in South Devon, Birds'-eyes, Robin-flower, and the Wren's-flower. Robin may be a corruption of Robert; but some of these names seem to indicate a more intimate connection of the plant with birds than is at all usual.

None of the Cranesbills dry satisfactorily, except, perhaps, *G. sanguineum;* and drawings of them in most cases fail to represent the blossoms in their proper colours. The illustrations to "English Botany" are no exception to this rule; and a lady of our acquaintance, whose wild-flower drawings have been greatly and deservedly admired, declares her inability to obtain, by any mixture of colours, the exact hue of the blossoms of *G. sanguineum*. Under these circumstances, therefore, it is the more necessary that those who would seek to improve their acquaintance with our Cranesbills should do so—not from books, not from pictures, not from dried specimens, but from the living plants themselves.

High Wycombe. JAMES BRITTEN.

* SCIENCE-GOSSIP, v. 134.

THE BULLFINCH.

(*Pyrrhula vulgaris.*)

THOSE who know the Bullfinch only as a cage-bird would hardly recognize him in his native haunts, so different does he there appear. In a state of nature there is scarcely a more active and restless bird; in a cage "what a falling off is there!" Let us take a peep at him in some of his favourite resorts, and compare him with the sluggish songster that hops lazily from perch to perch, and pecks alternately at hemp and sugar.

We have not to go far from the house, for in the orchard hard by we are almost sure to find a Bullfinch; but we must go very quietly, for he is a shy bird, and never suffers too near an approach. Do you hear that note? There it is again; a soft double whistle, uttered very plaintively. That is the call-note of the Bullfinch, and there is the author of it on the top of yon cherry-tree. Now he is off. Do you see the white upper tail-coverts as he flies? You cannot mistake him on the wing. And there goes the hen; she is much plainer in her attire, but shows the same patch of white when passing from tree to tree. Now let us watch them a little. They are apparently hunting for insects, but, sad to say, they are destroying a great many blossom-buds. Cherries, apples, plums, are all in turn attacked, and it is lamentable to think that a songster of such pleasing exterior is not to be trusted in an orchard. Yet so it is, and those who wish for a good show of fruit must drive away the Bullfinch from the buds; not, as some thoughtless gardeners do, with a charge of shot, which strips off more buds in a second than a Bullfinch could pick off in an hour, but by means of scarecrows and frequent visits to the trees. In this way you may save your fruit from the destroyer, and still hear his pleasing song. But it is only at a certain period of the year that the Bullfinch can do the damage of which we complain. When the young are in the nest they are fed almost entirely upon insects, chiefly caterpillars; in autumn the old birds find blackberries and various seeds; while in winter the fruits of the hawthorn and dog-rose furnish their chief food.

In some parts of the country are happily still to be found those delightful green lanes which were formerly more numerous, branching off from the high road for a mile or two, and leading only to green fields. These are known as "occupation roads," being for the most part used only by the occupiers of the adjoining lands for the purpose of carting hay and other produce, and driving sheep and cattle to and from pasture. In these lanes there is no regular roadway. The turf extends the whole way between the hedges, and but for the deep ruts made by the waggon-wheels, one might

almost regard them as long and very narrow fields. It often happens that in such lanes as these the hedges remain untrimmed for years, and grow to a considerable height; while in many places the lanes are so narrow that the trees on either side meet overhead. Nothing can be more beautiful than the appearance which a lane like this presents in the month of May. The hawthorn is then in full bloom, and the hedges are thickly draped with its white clusters. The banks are hidden with ferns and wild flowers, and a thick short turf stretches invitingly under foot. This is the spot for an ornithologist, for here the small birds love to congregate. The Chiff-chaff, Willow Wren, and noisy Whitethroat are heard and seen at intervals as we stroll down the long vista. The Swallow, first seen like a speck at the end of the lane, comes skimming over the ground impetuously towards us, only rising overhead when within a few feet, to avoid a collision; while the Chaffinch, Yellowhammer, and Great Tit, then in their best plumage, keep flitting in and out before us, and look brighter than ever against the background of white "May."

It is in a lane like this that the Bullfinch takes up its abode in summer, visiting the nearest gardens, and making raids upon the fruit-trees where opportunity occurs. As autumn goes by and winter approaches, we find him by the cover-side and in more sheltered situations. Many a time when standing, gun in hand, at the corner of a wood, waiting for the approach of the beaters, have we been enlivened by watching the actions of the Bullfinch and his friends the Tits, and we fancy some of our friends would laugh if they knew that we had allowed a hare to go by without shooting, in order to note the manœuvres of our feathered friends. It seemed to us at the time that there was a greater pleasure in observing the actions and habits of a living bird than in contemplating the body of a dead hare. But few, probably, would have agreed with us at such a moment.



Fig. 121. The Bullfinch.

We are obliged to confess that we never shot a Bullfinch, not even to ascertain by dissection the nature of its food; but, so far as we have been able to observe this bird when feeding in a state of nature, we should say that it is not insectivorous in the strict sense of the term, although, as before stated, the young are fed upon larvæ of various kinds, until they are able to take care of themselves, when they forthwith regale upon buds and fruit.

The nest is a truly wonderful structure, so loosely put together, and yet so symmetrical in shape. It is

formed of twigs and fibrous roots, and looks as if a sudden gust would at once scatter all the materials; but they are so cleverly woven together, and the interior is so compactly lined with fine fibre, that the outside twigs, which appear so loose, are all held firmly in position.

The eggs are five or six in number, of a pale blue ground-colour, spotted and blotched towards the larger end with purplish brown. Not unfrequently these spots are so regularly dispersed over the surface as to resemble a crown of thorns. The young, when hatched, are curious little fellows, their heads and bills seeming so disproportionate in size to the rest of the body. They are wonderfully clamorous for food, and the energies of the old birds must be severely taxed in flying to and fro all day with their mouths full.

We have sometimes felt inclined to leave a Bullfinch undisturbed on a fruit-tree, in consideration of the amends he would ultimately make by destroying insects for his family. But in this case we are not prepared to say that the good would quite counterbalance the evil. We fear it would not. Nevertheless, we prefer to treat our little friend like a spoilt child, and would rather miss a few cherries and plums than lose the pleasure of seeing him in the garden and of listening to his cheerful song.

J. E. HARTING.

FRAGILLARIA CROTONENSIS (*F. Kitton*).

By F. C. S. ROPER, F.L.S., &c.

IN the May number of SCIENCE-GOSSIP some notes appeared by Mr. Kitton on the diatomaceæ occurring in the water supplied to the city of New York, called, from the river which supplies it, "Croton water," and forwarded by Dr. Edwards to my late friend Dr. Walker Arnott, of Glasgow. From samples I have myself received of these Croton-water gatherings, I have no doubt Mr. Kitton is perfectly correct in his determination of the majority of the species that occur, and I fully concur with him in thinking that *Asterionella gracillima*, Hantzsch, is merely what is known here as *Asterionella formosa*, Hass., or at most a slight variety of that species. But I regret to find that he has been induced to give a new name and specific character to the form called *Fragillaria crotonensis*, especially as I know he strongly objects to this being done without full and satisfactory evidence. At the same time there is no doubt the species of *Fragillaria* are extremely variable in form, and without a very extensive suite of specimens any one may well be led astray.

Through the kindness of Dr. Arnott and other friends, I have a very complete collection of gatherings of this genus, including fifty slides of *F. capucina* and its varieties alone, from various localities; and this very form figured as a new species was one on which I had some considerable correspondence with Dr. Arnott only a few months before his death.

From a most careful consideration of all these gatherings, I have no doubt that the form in question is a *Fragillaria*, as Mr. Kitton supposes, but it is *F. capucina*, var. γ, of W. Smith's "Synopsis," vol. ii. p. 22, but of which he gives no figure, and states that it has only occurred to him in the Rosthorn Mere gathering supplied to him by Dr. Arnott. I have a slide of this; and the same variety occurs in another slide from Mr. Hardman, of Liverpool, and also in one from "Tol'-y-Llyn," in Wales, from my friend Mr. Groves, and in all combined with the true *F. capucina*. The passage from the typical form to the variety is best marked in the last gathering.

Mr. Kitton describes his species as "Frustules linear, inflated at the central part, where they cohere and form a ribbon-like filament." Smith describes *F. capucina* as with "Valves linear," and says of var. γ, "Frustule subsilicious, adhering imperfectly;" and in his note on the species he says, "When dry, the frustules in this variety shrink, except in the central and extreme portions, and remain loosely attached by these parts." From the slides I have, I agree with Dr. Arnott in thinking that the frustules frequently occur quite as strongly silicious in this variety as in the typical form, but it may probably be as Professor Smith suggests, a sporangial state of the species, though Dr. Arnott considered this doubtful; but it certainly is not entitled to rank as a distinct species.

THE MAY-FLY.

(*Ephemera vulgata.*)

THE May-fly has been, historically, very badly treated, and made appear a much poorer creature than it really is. As children, we were told, on the best nursery authority, that there was a poor gnat that lived a single day and then died; a story which filled our little minds with wonder and pity. It was a relief afterwards to learn that this one day of winged existence was preceded by three years of aquatic life; but this was qualified by the intelligence that through this long period it lived on mud. Such, indeed, was the assertion of Swammerdam, and this strange opinion, stamped with his great authority, has been received and handed down for more than two hundred years, almost to our own day. Mud was always found in the larva on dissection, therefore it must eat and live on it. Messrs. Kirby and Spence had some misgivings on the subject, and thought it must eat, in addition, decaying vegetable substances. The Rev. J. G. Wood, with his usual sagacity, while

testifying to the constant presence of the mud, thinks it probable that it is taken involuntarily with its other food, whatever that may be. In a translation of Louis Figuier's entertaining summary entitled "The Insect World," published in this country last year, it is correctly stated that this larva feeds on small insects; but no authority is quoted, and the mud question is not stirred.

My acquaintance with the Ephemera was made accidentally some years ago. Dipping for Daphniæ and other small crustaceans, an advanced larva, or pupa, of *Ephemera vulgata* was included in the capture, and all together transferred to a small aquarium. In a fortnight afterwards not a water-flea was left. The pupa, quivering with excitement from head to tail, swooped with unerring aim on the doomed crustaceans, so long as any were left, and he felt an appetite. A second supply was given, and shared the like fate; and now the growth of the pupa was completed. One fine May morning the graceful fly was found in the window; from which it escaped into the open air.

It had left three or four exuviæ, thrown off from time to time, and one of these, perhaps the last, exhibits, when mounted in balsam, a perfect impression of the mouth, and may throw some light upon the nature of the food. The jaws, when open, form a wide funnel for the more ready capture of a nimble prey; when closed, they seem designed to interlace each other and form a compact front to bar all escape. The teeth exhibit a row of slightly curved bars on one side, opposed on the other to a raised block, crowned with sharp serrated edges, and could be brought together with crushing effect on the poor little crustaceans. The back of the mouth is partly closed by a singular and curious contrivance; a deep egg-shaped sac extends across it, opening into the throat by valves or slits, fenced on the outside with fine hairs, which would permit the downward passage of a too lively Daphnia, but prevent its return. And here we may probably account for the constant presence of mud in the intestinal canal. A mouthful taken involuntarily in a struggle at the bottom with a lively prey and swallowed with it, would be retained by the fine sieves across the valves of the throat and pass into the stomach. Such a condiment might be even beneficial (for all such contingencies are weighed) by dividing the food, or, as seems very likely, by increasing the gravity of the body after a meal, and so enabling the larva to remain without effort at the bottom. My aquarium contained no mud, yet the pupa throve well; but in streams and eddies it might be difficult for so light a creature, furnished with a large breadth of branchial plates, to maintain its place or remain in concealment, without ballast; or it might be useful in other ways which we cannot even guess.

S. S.

THE LEPIDOPTERIST'S GUIDE.*

MANY a time and oft have we been solicited to name a book for the use of those who have no knowledge whatever of the art of rearing, catching, or preserving insects. Through nearly all orders this query has traversed, but oftenest has it related to the Lepidoptera alone, and the editorial murmur has been little other than a grumble in reply. At length a light has broken upon us, and we rejoice in the prospect of a happier future. Let any one now inquire for a guide, and we have an answer ready; one which we have had serious thoughts of keeping permanently in type, or stereotyping: it is—the title of the book announced at the foot of this page—Dr. Knaggs's "Lepidopterist's Guide." The author is just the man, of all others, we should desire for a cicerone, and so would all who seek the service he proffers. As one of the editors of the *Entomologist's Monthly Magazine* we may at once take it for granted, without any further assurance that the science of the book is all right, that the subject is treated by a practical hand, and one well up to the work. But that is not all, there is another recommendation, and a very strong one with our readers,—the author has such a happy knack of popularizing his subject, so facile in saying a plain thing in a plain way, so clear in his instructions, so hearty and enthusiastic in his work, that any one would wish himself an ignoramus again to have the pleasure of such a teacher. In these days of compiling, and book-making, and dealing freely with other men's brains, your reviewer can hardly resist the temptation to become enthusiastic when he encounters a book that is really original, and, like the present, a reflex of the author himself, and his own flesh and blood experiences.

Let us briefly scan the book itself, and see what its closely but clearly printed one hundred and twenty pages contain. It is a "Lepidopterist's Guide," all about moths and butterflies that the inexperienced collector wants to know. Of course some of the hints and methods are everybody's property, but the author in the preface cautions the reader against supposing that all comes out of his own head, and he has no desire to appropriate what does not belong to him. He gives old or well-known methods, whenever he has no better of his own to offer, or no better are needed. The little bits of fun which sparkle here and there is not the sort of thing for us to condemn. *We* do not think that because a writer deals with scientific subjects

* The "Lepidopterist's Guide," intended for the use of the young collector, containing full instructions for the collecting, management, observation, and preservation of Lepidoptera in all their stages. By H. Guard Knaggs, M.D., F.L.S. London: Van Voorst.

he is never to be guilty of a pun or indulge in a joke; on the contrary, we have a horror of a long face, protracted *ad infinitum*. But—back again to the book—we have the egg state, the caterpillar state, the chrysalis state, and the perfect state; and in all states hints for collecting, management, observation, and preservation. Looking over the pages for something to quote in illustration, we found ourselves involved in a dilemma, because of there being so much to quote, that we could not come to a resolution as to which was the best for the purpose; and as we have not yet made up our minds, it is exceedingly probable that we shall postpone the experiment till the query of some correspondent sends us to the book for an answer.

What can we say more than we have said to assure our readers of the good opinion we have formed from a brief and hurried acquaintance with this "Guide"? Will no one give us companion guides in other branches of natural history, and especially a plain and easy guide to the study of insects in general; a kind of portable manual of entomology such as would enable a youth, not yet a collector, to recognize Coleoptera, Lepidoptera, Hymenoptera, and all the other *opteras*, and thus prevent some of the mistakes so commonly made, and do good service to science. We heartily recommend every "young collector," and every one who wishes to become a collector, to purchase this book. For others, who have either done collecting, or do not intend to begin, we pity them in their loss of such an excellent companion and "Guide."

ZOOLOGY.

TAME FISHES.—The pond (Lombock) was well stocked with fine fish, which come every morning to be fed at the sound of a wooden gong, which is hung near for the purpose. On striking it, a number of fish immediately came out of the masses of weed with which the pond abounds, and followed us along the margin expecting food.—*Wallace's Malay Archipelago.*

RARE BIRDS IN NORFOLK.—I have much pleasure in recording the occurrence of the *Ruddy Sheldrake* in Norfolk. On the 26th of March last an adult male was killed on the Snettisham beach by a Mr. Wright, in whose possession it now is. This is the first instance of its occurrence in this county on record.

The Crane.—On the 1st of May two Cranes were seen by a crow-boy on a barley-field at Hemsby, in East Norfolk; he called a man, who followed them with a gun, and succeeded in killing one in a field in the adjoining parish of Summerton. This bird was sent to London to Mr. Hume, the owner of the soil, for whom it has been preserved. A crane has since been killed on the Severn, which may possibly be the bird seen in company with the Summerton specimen. Mr. Stevenson has kindly given me a list of the occurrences of the Crane in this district, as follows:—One killed at Feltwell, 1836; one killed at Kirkley, near Lowestoft, April, 1845; a bird of first year killed at Matham, Feb., 1850; a Crane seen by Mr. H. M. Upcher, near Warhand, afterwards seen in Sandringham Marshes, spring, 1865; two seen, one killed, at Summerton, May, 1869.

Marsh Harrier, two males; *Hen Harrier*, one male, one female; *Montagu's Harrier*, two males. All the above killed at Hickling Broad, with the exception of one of the Marsh Harriers, which was killed at Catton, between the 12th and 22nd of May.

Two *Hawfinches* killed at Brook, near Norwich, on 15th May; male and female: the female contained an egg almost fit for exclusion.

Golden Eagle.—Mr. Stevenson has succeeded in establishing the Golden Eagle as a Norfolk bird, from a specimen found dead upon the Stiffkey Marshes in November last.—*Thomas Southwell, Norwich.*

THE AUSTRALIAN WILD HORSE.—"The wild horse of Australia," says the *Avoca Mail*, "will unquestionably, at no distant date, like the mustang of the South American pampas, occupy in vast numbers the almost boundless plains of the interior. On the South Australian border, in Victoria, where some few years ago wild horses were comparatively few in number, large herds are now to be found. During periods of continued drought these herds travel immense distances in search of pasture, and on some stations detract considerably from the value of the runs to the north-west. The neighbourhood of the mallee scrub at the present season appears to be a favourite resort for wild horses. Feeding on the plains in mobs of from fifteen to thirty mares with colts at foot, the sire, a stallion whose progeny are usually of one colour, is most careful of his family, on the slightest alarm leading his charge at full speed under shelter of the almost impenetrable scrub. Several successful musterings of these steeds of the plain have been made of late, we are informed, and some of the colts broken in and sent to market, but from the cheapness of horseflesh all over the colony, the speculation has not paid. Many hundreds have been shot on the various stations, but apparently without reducing their numbers. Wild cattle in the neighbourhood of the mallee scrub have also become a complete nuisance. On the sheep stations beef of excellent quality is supplied all the year round as rations to the men employed. The wild cattle are hunted like the buffalo of the North American plains, and are said to be gradually increasing in numbers and spreading towards the Far North. The most astonishing circumstance attaching to these wild

herds of cattle and horses is that, notwithstanding on the stations near their haunts sheep and other stock are dying very fast from the effects of the drought, these denizens of the plain appear in excellent health and sleek as moles. A most beautiful sight it is to see a large mob of wild horses startled on the plains, galloping at full speed, their unkempt manes floating in the wind, the speed of which they seem to equal; their tails sweeping the ground—they present to the eye a perfect embodiment of beauty and freedom."—*Adelaide Observer.*

Leeches.—A curious fact concerning these useful creatures has come under my notice lately, and as it may interest some of the readers of Science-Gossip, I give the particulars as I received them from a neighbour. Two leeches having been made use of, were then restored to their former condition, put into a small ornamental pond in the garden, in which were growing waterlilies and other plants, and they were thought no more of. About two years after their introduction, six fine gold-fish were put into the pond, and greatly to the dismay of their owner, the following morning two of these were found dead and literally covered with leeches, and all the others were so dreadfully mutilated that they soon died from the effects of their wounds. On examination, the pond was found to be swarming with leeches, from the size of threads to the full-grown, plump, and, I must add, handsome-looking animal; it was cleared of them, and the bottom, sides, and holes of the pond lined, to prevent further mischief. The workmen employed offered the leeches for sale to the chemists, who refused them as they were not imported from abroad, but a physician here considered them quite equal to their foreign congeners.—*C. E. F., Redland, Bristol.*

Norfolk Rarities.—Two fine specimens of that rare visitor to Norfolk, the Crane (*Grus cinerea*), have been shot this spring; one on the 7th of May, at Somerton, another on the 4th of June, at Pickenham. About a fortnight previous, a fine Badger (*Meles Taxus*), weighing 26 lb., was captured near the latter place.—*E. A., N.*

A Cat devouring a Slow-worm.—This afternoon, seeing my cat busily munching something edible she had discovered in the garden, I was induced to notice her proceedings more closely, and was surprised to find she was masticating the remains of a slow-worm, of which she had consumed a considerable amount. The portion of the unfortunate reptile yet remaining was about five inches long, and as the creature appeared to have been ten or more inches in length before it was injured, at least half had been consumed. The viscera were protruding, but the hapless animal was still living and capable of some movement, so, though it did not show any sign of suffering, I deemed it humane to end its existence with the nearest available weapon—the garden roller. This is the first instance that has occurred to me of a cat devouring any reptile, and in this month's number of the *Zoologist*, the repugnance of carnivora to prey on the Batrachia is particularly noticed.—*George Guyon.*

Tree-frog.—A few mornings ago I introduced a house-fly into the vivarium, and one of the green tree-frogs sprang at it from his perch; he missed his aim, but the secretion with which the tongue of the frog is furnished stuck the insect against the glass, where it remained nearly motionless, apparently stunned by the blow it had received. The frog, as usual, adhered to the glass where he had alighted, and seeing some slight movement of the fly, with another snap and gulp secured his prey. These little frogs often miss their stroke, but in such cases I have always seen the fly dart away; in this instance, though the attempt failed, the glutinous saliva sealed the insect to the spot, as it were, till the stroke was repeated with success.—*George Guyon, Ventnor, Isle of Wight.*

Earthworm.—At a recent meeting of the Zoological Society, a communication was read from Dr. W. Baird, containing additional remarks on an Earthworm (*Megascolex diffringens*), of which the occurrence had lately been noticed in North Wales. Dr. Baird had recently obtained specimens of this worm from two localities in the Eastern counties, but there appeared to be little doubt of its being an introduced species.

Landrail (*Crex pratensis*), called in the North and East Ridings of Yorkshire, "Corncrake," "Meadow-crake," and "Daker-hen."—The following shows the arrival of this spring visitor for the last six years: 1864, April 17th; 1865, May 1st; 1866, May 7th; 1867, May 13th; 1868, May 14th; 1869, May 1st.—*J. Ranson, York.*

Otters.—The Otter is to be found in the river Seven, a tributary of the Yorkshire Rye. The Seven rises in the North Yorkshire moors, runs through the pretty dale called Rosedale, and the wood-embowered valleys of Cropton and Appleton-le-Moors, through Sinnington, to the Rye. I have frequently found fish remains, and more than once have caught and found fish that had been bitten by the Otter. I have frequently been present at otter-hunts in the river, and on one occasion a bitch was killed in the mill-dam at Appleton, which we found weighed 21 pounds. The mill-dam and the Nut-holm is a frequent resort and breeding-place, and the pursuit of them with otter-hounds affords excellent sport. Some years ago otters were frequent in the Kyle, a tributary of the Yorkshire Ouse, and within the last ten years feetings of the animal have been traced upon the sand and mud at Linton Lock, ten miles above York.—*John Ranson, Linton-on-Ouse, York.*

BOTANY.

HABENARIA BIFOLIA.—In two specimens that I have gathered this year, there have been pollen-masses growing out of the tip of the spur, on the under side of the lip, and in one of them from the centre and base of the back of the centre leaf of the calyx, whilst in almost every blossom there was one at the base of the column. They are irregularly egg-shaped masses of pollen, the glands of the stalks swelling into a bulb where they grow out of the spur or lip. On examination with a microscope, I found that with a fine needle I could draw the pollen-masses out, which lay loosely in the two-celled anthers, which made me think at first that I had shaken some out unawares, and they had adhered. But on trying to move them, I found them firmly fixed even after they had been a fortnight in my press in paper changed every day. This spring I have found unusual numbers of imperfect flowers and uncommon varieties, as the peculiar variety of *Stellaria media* mentioned in Hooker's "British Flora" as having been found near Cork, by Mr. James Drummond.—*M. C., Kent.*

POLYSTICHUM ACULEATUM.—I have a dried frond of the common Prickly Fern (*P. aculeatum*), which has taken a very remarkable form. It grew in my own garden, and had been but recently transplanted from the woods; so that the change of soil and situation probably exercised an influence upon its growth. The lower half of this frond has all the characters of *P. aculeatum*, and differs in no way from the rest of the fronds upon the plant; but at this point it abruptly changes, and the upper half exactly resembles *P. lonchitis*, not only in general form, having short undivided pinnæ, but even in the absence of brown scales upon the rachis. Whether this frond shows that *aculeatum* and *lonchitis* are permanent varieties of one species, as some botanists think, I do not venture to say. The other half of my frond *may* be only the variety that is known as *lonchitidioïdes*, but I have compared it over and over again with veritable *lonchitis*, and I can detect no difference.—*Robert Holland, in Quart. Mag. High Wycombe Nat. Hist. Soc.*

WOLFFIA ARRHIZA.—To the localities named at p. 138 for this little plant, the following, from the last *Report of the London Botanical Exchange Club*, may be added:—"A pond in a large meadow on Apse Farm, near Sunbury Lock, between Walton-on-Thames and Moulsey Hurst, Surrey; also in a splash of water, very near the church, in the parish of East Moulsey, a short half-mile from Hampton Court station."—*James Britten.*

LOCAL NAME OF THE GOOSEBERRY.—Throughout a great part of Lancashire—all the district around Rochdale—the Gooseberry is always called "Fayberry." You are asked to take "Fayberry pie," and the word is in constant use. A correspondent writes to me that this word is an Anglo-Normanism, being derived from "faye," or "faie." Our older poets used the word "fay" for "fairy." "Fayberry" therefore means "fairyberry." He further remarks that our Lancashire men have retained the word, but have lost all tradition about it; but in Ireland there is a tradition connecting the Gooseberry with a fairy, the Leprahawn, who is represented as pursuing his occupation seated on a Gooseberry bush, but apparently no corresponding name. It is remarkable that one other distant county has supplied us with a similar name for the Gooseberry, namely Norfolk, where it is called "feaps," "feabs," or "fabes." I should be much obliged to any correspondent who could tell us something more about the doings of this Irish fairy, and whether there is any Irish name for the Gooseberry tree which would connect it with fairies, or if any tradition yet exists in any part of England which would account for the name "fayberry."—*Robert Holland.*

NEW PEZIZA.—At a meeting of the Linnean Society, March 18, Mr. W. G. Smith exhibited fresh specimens of a new British Peziza, *P.* (*Discina*) *macrocalyx*, found by Mr. J. A. Clarke, of Street, Somerset.

SCIRPUS PARVULUS.—Found last year "on mud flats at the mouth of the river Avoca, Wicklow, Ireland; Mr. A. G. More and Mr. Charles Bailey. In the sixth edition of the 'London Catalogue,' *Scirpus parvulus* was placed in the list of excluded species, as it was believed to be extinct in the only known British locality, namely, near Lymington, Hants, where it was found by the Rev. G. E. Smith about 1840; the discovery of this plant last summer, therefore, on the east coast of Ireland, by Mr. A. G. More, was a welcome surprise to British botanists."—*Report, London Bot. Ex. Club for* 1868.

MISTLETOE.—I quite agree with Mrs. Watney, that in spite of the customs of the Druids, the Mistletoe is eminently a Christmas berry now-a-days, and the owners of orchards where it grows reap quite a harvest from it at the merry season. It is almost unknown in the north as a native, but it comes to us in truck-loads by rail from Herefordshire and Worcestershire, and its valued sprays are put in the most conspicuous place in our Christmas decorations.—*Robert Holland.*

WOOD-SORREL, the true Shamrock.—I have heard it asserted that the true Shamrock of the Irish was the *Oxalis Acetosella*, our Wood-sorrel. It is a much prettier plant than either of the trefoils now said to be the Irish Shamrock, and one of the old English names given to the Wood-sorrel was *Sour* Trefoil.—*Helen E. Watney.*

MICROSCOPY.

The Microscope.—Whether for purely scientific, recreative, or educational purposes generally, the microscope supplies the most effective, perhaps, and certainly the most easily applied, amongst the numberless agencies of the present day. To quote the eloquent words of one of the most eminent naturalists: "Great and gorgeous as is the display of Divine power and wisdom in the things that are seen of all, it may safely be affirmed that a far more extensive prospect of these glories lay unheeded and unknown until the microscope revealed it. Like the work of some mighty genii of oriental fable, the brazen tube, through its crystal portals, exhibits a world of wonder and beauty before invisible, which one who has gazed upon it can never forget, and never ceases to admire." Nor is this all. The microscope teaches us to see a world in every atom, and that every grain of sand may harbour within it the tribes and the families of a busy population. It tells us that in the leaves of every forest, and in the flowers of every garden, and in the waters of every rivulet, there are worlds teeming with life, and numberless as are the glories of the firmament. It can be used without a teacher. It is equally interesting to the child and to the man. It can be employed alike at home and abroad. Its instructions are the exhibition of facts of the most astonishing variety and beauty. It unfolds, on the one hand, the most recondite laws of science; and on the other, it illustrates the commonest matters of every-day life. It fascinates the more it is cultivated. And all its revelations display the perfection and the glory of the works of God.—*Circular of the State Microscopical Society of Illinois.*

Eger Deposit.—There is a stratum, discovered by Ehrenberg at Soos, near Eger, in Bohemia, that consists almost entirely of the remarkable discoid forms of an oval figure, curved twice in opposite directions, and from their resemblance to a shield, have been named by him *Campylodiscus clypeus*. When the learned Professor visited this country in 1841, he brought with him the first specimens that had been seen of this earth. The discs in almost every instance are very perfect, and in addition to their curious shapes, have markings worthy of notice. —*Quekett's Histology.*

[The Editor has a few slides of this deposit for exchange for any good mounted objects.]

Lepisma saccharina.—"G. M." recommends a good cluster of scales viewed with an inch objective and spot lens, as the best mode of exhibiting them.

Scale of Dace.—We have already given figures of the scales of several of our common fresh-water fishes, and to these we add another, that of the Dace (*Leuciscus vulgaris*). It must always be remembered that the dorsal and ventral scales will differ considerably in form, and that in preparing and mounting scales for the microscope it is preferable to have scales taken from different parts of the body. We are compelled to rest content with figuring the prevalent form. We should be happy

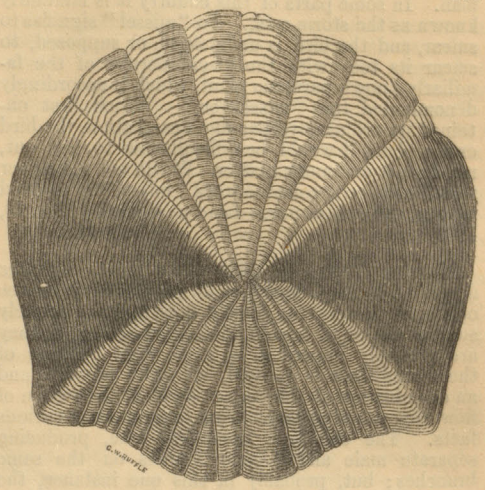


Fig. 122. Scale of Dace.

to receive specimens of the scales of any of the less common fresh-water species, in order to continue this series. Careful and accurate identification indispensable.

Mounting Small Insects.—I have adopted successfully the following plan of preparing and mounting very small insects for the microscope, such as parasites and acari from birds, beetles, &c. Having procured the parasite alive, I place it on the inside of a sheet of tolerably good note-paper, folded, and when in the act of running, I close the paper and press it tightly in a book, which, for want of a better press, I put between two books in my bookcase. By this means I find the legs, antennæ, &c., nicely extended, all the expressed moisture absorbed by the paper, and the skin apparently unbroken. I allow it to remain in the book about two days, when it is carefully removed from the paper, put into the turpentine bath, and afterwards mounted in balsam in the usual way.—*A. A., F.*

Q. M. C.—The annual excursion dinner of the Quekett Microscopical Club came off on the 23rd of June, at Leatherhead, with entire satisfaction to all parties concerned. Of course the toast of the evening was "The Quekett Microscopical Club," which was immediately succeeded by "The Royal Microscopical Society," acknowledged by Dr. Miller. This was one of the most successful of the social gatherings of the club, and those who were absent have reason to regret that they allowed the finest day of the season, and an excellent opportunity for enjoying themselves, to pass without recognition.

NOTES AND QUERIES.

MISSEL-THRUSH AND MISSEL-TOE.—The missel-thrush or missel-toe thrush (*Turdus viscivorus*) is an Old World species, which has become much more common in the British isles within the memory of man. In some parts of this country it is familiarly known as the storm-cock. To "missel" signifies to smear, and the bird is understood, or supposed, to smear its toes with the viscid berries of the familiarly known parasitic plant, which is accordingly denominated the "missel-toe." Which first obtained its ordinary vernacular designation, the bird or the plant, it would be difficult now to find out, nor does it overmuch matter. We do not remember that the formerly common word "missel" is retained in any other instance.—*Land and Water*, May 22, 1869.

MAIDEN TREES (p. 143).—The barren oak-tree described by Mr. Dingley, in all probability produces only male flowers, the female flowers being entirely suppressed, or, if female flowers are produced, they are probably imperfect in some way. Either of these conditions is unusual, but quite possible, and an examination of the young shoots at the season of flowering would perhaps bring to light some curious facts. The oak is a *monœcious* tree, producing separate male and female flowers on the same branches; but, probably in this one instance, the suppression of one set of sexual organs has been more fully carried out, and the Birmingham "Maiden Oak" has become, in fact, a *diœcious* tree. It would be well for those who can do so, to look out for other barren oak-trees, and observe the condition of the flowers, if any are ever produced. Though I have never noticed that certain oak-trees are barren, I have often remarked barrenness in individual hollies. I have seen trees which year after year produce vast quantities of flowers, but upon whose branches I know from experience it is always useless to seek for scarlet berries at Christmas-time. This has puzzled me considerably, for the flowers were apparently perfect, having both stamens and pistils; but upon comparing them with flowers from a fruit-bearing tree, I now find that the pistils are not fully developed, having ovaries, but no stigmas. I have not yet found one solitary perfect flower upon any of the barren holly-trees I have examined, and hardly an imperfect flower on any usually fruitful tree. These facts seem to show that in the holly there is an approach to a diœcious habit; indeed, it may prove to be the case that fruitful trees are never self-impregnated, but receive the pollen from the barren trees through the agency of insects.—*Robert Holland.*

LOCAL NAMES OF BUTTERFLIES (p. 140).—The working-men naturalists, of whom there are so many in the manufacturing towns of Lancashire and Cheshire, also make a distinction between white and coloured butterflies. They call the former "butterflies," the latter "red drummers." These men, pent up in the mills all the week, go into the country on Saturday afternoons and on Sundays to collect. Many of them are well up in the scientific names, and know the habits of each insect, what the caterpillar feeds on, how it "makes up," and when to look for the perfect insect; but they have generally a strange fancy for collecting certain species by hundreds and thousands, in order to make pictures of them. For this purpose the butterflies are paved as close together as possible, often overlapping each other, in various patterns, forming, when the colours are well blended, a rich and beautiful mosaic. But not unfrequently they are worked up into a picture—a representation of George and the Dragon, Adam and Eve, or some such subjects, in frames three or four feet square. These are hung on the walls and are greatly valued. I cannot conjecture what can be the meaning or derivations of the Buckinghamshire name "hobhow-chins," unless "hob" has some connection with the fairies. The "huddieduddies" does not seem to me to express the soft slimy nature of a snail, but rather the round fat form; for I have a vague recollection of some childish riddle, the exact way of asking which I forget, but which had this rhyme in it,

> "Hoddy-doddy,
> All head and no body";

the answer being "a snail." The word "hoddy," or as in Buckinghamshire "huddie," seems, I think, to refer to the snail's house being in the form of a *hood.—Robert Holland.*

NOTICE.—A gentleman who has made a rock-work, planted with ferns, in the front of his house, near Winchester, has placed up the following notice, and found it efficient:—"Beggars, beware! Scolopendriums and Polypodiums are set here."—*Evening Star*, May 29th, 1869.

CATS BEFORE A STORM.—"J. H." asks if cats are aware of an approaching storm? I am quite sure they are under atmospheric influence. I have three cats, and invariably notice that before a high wind they race in an excited manner about the house and grounds.—*E. A. S.*

CAT AND PUFF-BALLS.—Our tom cat is very fond of both puff-balls and mushrooms; he will eat either of them, and finds them out by scent directly they are brought into the room.—*H. C. Leslie.*

HYBERNATION OF HUMBLE BEE.—Allow me to correct two errors which appeared in last number of SCIENCE-GOSSIP. At page 135, the 16th line, "in the insect tube," should have been "in the insect tribe." In the 27th line of the same page also, "definitive" should have been "depurative."—*W. Bevan Lewis.*

LEAF OF INDIAN PINK.—I have just met with a somewhat curious, and I think not very common, transformation of a leaf of a seedling pink, in which the two edges of the leaf seem to have joined together, and form a kind of conical cup at the end of the stalk.—*E. T. S.*

OTTERS.—If Mr. Middleton will refer to the last six or seven numbers of *Land and Water*, he will hardly find one without some account or other of Otters. May 15th, there is an account of a hunt by the Carlisle otter-hounds.—*W. Priske.*

CURE FOR WHOOPING COUGH.—I remember being told some years ago that in some parts of Sussex the dark hair cut off the cross on a donkey's back, chopped up finely and spread between bread and butter, is an infallible remedy for this malady, and has really been given by the poor to their children. This recipe, as well as the cure for jaundice mentioned in SCIENCE-GOSSIP of June, surely requires the greatest amount of faith on the part of both patient and nurse before their virtues could be of any efficacy, as they are both of so revolting a nature.—*C. E. F., Redland, Bristol.*

More Light for Drawing.—If "W. E. B.," Swansea, will buy a Bockett lamp, or else have one of the metal chimneys fitted on to an ordinary parafine lamp, he will get all the light he requires. But I fancy if he were to use Mr. Scantlebury's plan he would get more light still, as the mirror intensifies the light on the paper. I have found that Mr. Scantlebury's is the most perfect method for drawing; but I have somewhat modified it, and done away with the expense his apparatus would be, by slipping off the mirror of my microscope and fitting it by means of a wine-bottle cork on to the stand of my condensing bull's-eye; then I direct the rays of light through the object by means of one of Collins' Bockett lamps.—*C. B. H.*

Microscopic Preparation.—"H. W." had better procure "The Microscope in Medicine" by Prof. L. Beale, where he will find all he requires respecting both transparent and opaque injection, treated at far greater length than the narrow limit of a reply in Science-Gossip would permit. The probable cost at a second-hand book-shop would be about five shillings.—*J. W. G.*

The Blood.—Mr. Scott's difficulty relative to the white corpuscles of the blood probably depends on the term *white* as applied to them. The more applicable term is *colourless*. A high authority states the relative proportions of the globules in the blood of the higher mammalia, to be one colourless to two or three hundred coloured. In man, however, we have reason to believe the colourless exist in far greater proportions. A case of *anæmia* (where the red are deficient in quantity) or of *Leucocythæmia* (where the colourless are *actually*, and not merely *relatively*, increased in quantity), will at once, by microscopic examination, satisfy Mr. Scott that these corpuscles really exist. For their detection he should rely on the following distinctive features:—

	Colourless.	Red.
Diameter (average)	$\frac{1}{2750}$th of an inch.	$\frac{1}{3200}$th of an inch.
Form—	Spherical.	Biconcave, flattened discs.
Contents—	Colourless, with a few molecules.	Hæmato-globuline.

The red have a great tendency to adhere in *rouleaux*; hence, the colourless remain more or less isolated. The effects of *osmosis* may be readily remedied by employing a medium such as glycerine diluted to the same sp. gr. as that of Hæmatoglobuline.—*W. Bevan Lewis, L.R.C.P. (Lond.).*

Preservation of Insects.—If Mr. Alfred Allen, instead of dipping his moths in benzole, will try the following recipe, he will find that no insect whatever will touch them. Dissolve corrosive sublimate in spirits of wine, adding the sublimate until a whitish deposit is formed upon a black feather dipped in the solution; then add about one-sixth more spirits; dip the moths in this, then drain off the fluid from the wings, and let them stand in a thorough draught to dry.—*C. B. H.*

Boiled Lobsters.—Perhaps some of your readers can tell me why lobsters and prawns change colour when boiled.—*F. G. Mountford.*

Management of Leeches.—You have had two or three paragraphs upon this subject. Years ago I used to have a good deal to do with them, and no way of treating them is more successful than, when they are taken off a patient, to put them on a plate with some brown sugar; where they are left a short time and then washed. I have repeatedly re-used them in the course of a quarter of an hour or so. The keeping of them depends almost entirely in constant change of water, and well washing them from the skin or slime they throw off.—*E. T. S.*

Suspended Moles.—"The mole-catchers are in the habit of suspending their victims on branches, mostly those of the willow, or similar trees; but their object I never could make out, nor could they give me any reason, except that it was the custom."—(Wood's "Common Objects of the Country," p. 25.) The object the mole-catchers have in view is plain enough. They wish to let their employers see that they are attending to their duties, and attending to them successfully. In order to do this they suspend their victims in some public place on the farm, or in the village. In this neighbourhood the mole-catchers are in the habit of emptying their baskets by the roadsides in some public part of the village, where they can be easily seen. I have frequently seen them, and smelt them too. I have counted thirty in a heap.—*J. Ranson, York.*

Vegetable Hairs.—Those interested in the hairs of plants as microscopic objects will find beautiful stellate examples on the under side of the leaves, and on the stems of *Aralia papyrifera*, the Chinese rice-paper plant, fine specimens of which may be seen in the Subtropical Gardens at Battersea Park. I have a small quantity of the leaf, and shall be glad to send some to any of your correspondents on receipt of address and stamps to cover postage. I have also a small quantity of pollen of *Cobea scandens*, and a few mounted slides of same for exchange.—*J. Carpenter, Waltham Cross, Herts.*

Death of a Tortoise.—In the early spring I bought a good-sized tortoise of the common sort, and turned it loose in a small walled garden. At first it seemed to eat nothing; but as its summer appetite began to awake, we gave it lettuce and cabbage-leaves. A few days ago it was found on a flower-bed, between a scarlet geranium and the brick wall, with a greenish slimy froth issuing from its jaws, which it endeavoured to rub away with its fore-legs. It opened its mouth at intervals, and made a clicking or gasping sound, and finally it pushed itself violently against the wall, vomited a quantity of greenish slime, and when visited a few hours later, at was found dead and stiff. I was away from home the time myself, but my two sons, who reported the circumstance to me, came to the conclusion that it had poisoned itself by eating unwholesome food. We examined the scarlet geranium, but found no signs of its leaves having been bitten.—*F. T. Mott, Leicester.*

Bryopsis.—"M. D." has proved *Bryopsis* to be one of the best seaweeds for an aquarium, but is now out of it, and wishes to know where it can be procured in London.

Why do Insects Fly to the Light?—On reading "W. H.'s" article in Science-Gossip for June, I took a light and held it near an aquarium containing Water-scorpions, Notonecta, and Newts—very few of which are vegetarians. The two former were instantly struggling against the side of the glass towards the light, and in the course of less than a minute, several of the newts were with them. A farmer tells me that he has frequently known owls and night-jars fly against the windows of a lighted room.—*J. G. Odell.*

HYBERNATION OF THE HUMBLE BEE.—Thanks are justly due to those who have illustrated this subject. The matter in Maunders's "Treasury" appears to have been derived from "Kirby and Spence," letter xv.; those able writers had access to all that Reaumur and Huber have produced on the matter in question, and they sum up adversely thereto, letter xxvi. Their conclusion seems to be that sensation is preserved by artificial warmth, and that the degree of cold sufficient to produce true hybernation would kill them. The insect alluded to is probably *Bombus lapidarius*. An amount of interest has now been awakened among several observers that will, I am sure, lead eventually to a full light being thrown upon this very interesting circumstance. It would seem desirable in further investigations to ascertain, by digging, whether such solitary lurking-place is, or has been, connected with a larger nest in the neighbourhood.—*N. Hall.*

ORCHIDS WANTED.—While thanking those correspondents who so kindly sent me the orchids named in my last, may I say how much obliged I should be for *fresh* specimens of *Malaxis paludosa*, *Sturmia* (*Liparis*) *Loeselii*, or any of the north-country species, such as *Gymnadenia albida*, *Listera cordata*, &c. Those interested in orchids may like to know that I published a list of the Buckinghamshire species, with notes and localities, in the *Quarterly Magazine of the High Wycombe Nat. Hist. Soc.* for April last.—*James Britten, High Wycombe.*

TENNYSON AS A NATURALIST.—VIOLETS UNDER ASH-TREES.—Since reading a paragraph in your May number, headed as above, I have taken particular notice of the plants, &c., growing under Ash-trees. In many instances I have found Violets (*Viola canina*) growing under them and nestling between the roots; while the wild Hyacinth, I have remarked, blooms in greater abundance under the Ash than anywhere else. The following are a few of the plants I have noticed as growing in *profusion* under the Ash: Ferns of several kinds, Wild Rose, common Bramble, Woodruff, Mercurialis annua, Veronica Chamædrys, Potentilla anserina, and P. reptans; besides others too numerous to mention, and all, not only beneath the trees, but between the roots, and as close to the stem as possible. We have also a fine clump of Rhododendrons just now in beautiful bloom, surrounding and concealing the bole of a large Ash-tree; while many, indeed most, of the fields hereabouts have one or more of these trees in their midst or within their limits, and the corn grows as near them as the plough can be taken. The result of my observations has been that almost all vegetation is more luxuriant under the Ash than any other tree.—*H. S. M.*

NEREIS BILINEATA.—I have from time to time had many of these worms in my aquarium, but until lately have never succeeded in keeping one long, as they would not eat, however much I tempted them to do so, seeming not to possess the slightest sense of smell, and they consequently died of starvation. At last, however, I am fortunate enough to possess a specimen that entirely differs from its predecessors in this particular, as it greets the stick with which I feed them with delight, and even follows it, and hunts about for it if I withdraw it; it lives in a tube which it made for itself during the winter, from which it appears when hungry, and to which it retires when it has finished its meal.—*E. J. Johnson.*

A NORTHERN NOTE.—This morning, June 16th, Kirkstone and High Street, Vale of Troutbeck, are deeply covered with snow. Coniston and range are also covered, but not so deeply. Wind easterly. Can it be but eight days off *Midsummer's* Day!—*F. S. T.*

PARROQUET BREEDING.—I recommend "T. B. N." to feed his Love-birds upon millet-seed. I knew two ladies who kept these birds, and millet was almost the only food given them at all times.—*F. C. H.*

BADGER IN NORFOLK.—At the May meeting of the Norfolk and Norwich Naturalists' Society, a paper by Mr. J. H. Gurney on the "Mammalia of Norfolk and Suffolk," was read by the secretary. Speaking of the Badger, Mr. Gurney says he "supposes it to be nearly extinct in Norfolk; the last he heard of was captured about ten years since at Intwood," near Norwich. In a note, however, he adds, "I was informed to-day (6th May, 1869), by Mr. W. B. Hume, of Bromley Hall, Norfolk, that a badger was trapped last year on his estate at Somerton. It was found dead in a sheep-fold, having dragged the trap no less than four miles from the spot where it was first caught." In the discussion which followed, it was stated that where fox-hounds were re-introduced into this district, some badgers were turned off to make earths for the foxes; it is quite possible, therefore, that the badger killed on Mr. Hume's estate might have been one of these, or descended from them, and that Mr. Gurney's observation, applied to the old race of Norfolk Badgers, is quite correct. Since the above was written, Mr. Stevenson has informed me that a badger was killed very recently near Swaffham.—*T. Southwell, Norwich.*

VOLVOX GLOBATOR.—It may interest some of the numerous readers of SCIENCE-GOSSIP to know that *Volvox Globator* may be found in great abundance in a pond at the foot of the Addington Hills, near Croydon, Surrey.—*F. W. W.*

A LONG SLEEPER.—I had a caterpillar of the Puss Moth brought me by a friend twelve months ago last August: it formed its cocoon a few days after I received it, and has been lying in that state for twenty-one months. This morning the moth made its appearance; is this not an unusual thing?—*H. Chalwin.*

THE OAK.—There is, or was at least in 1864, a singular tree growing in the grounds of the Woodrow Inn at Cawston, about nine miles from Norwich. This tree was called by the landlord the "Oak-leaf Hornbeam Beech," and had most distinct leaves of each genus growing on the same branch. It was considered a great curiosity in the neighbourhood, and visitors were in the habit of going to admire it. Can any of your readers give any further account of it, or explain the phenomenon?—*H. N., Oscott.*

THE SHAMROCK.—With reference to this much-vexed question, I feel that no satisfactory conclusion will ever be arrived at, as so many difficulties apparently lie in the way. For my part, I consider that the arguments in favour of the *Oxalis acetosella* are not without their due weight, since we know that Ireland was at the time of St. Patrick very thickly wooded, and, as antiquarians argue, this plant was doubtless very plentiful. I do not deny that the

Trifolium minus is most generally used at present this is, however, no conclusive argument in its favour, for it is highly improbable that a tradition which had only for its basis the minute peculiarities which distinguish one trefoil from another, should have remained unchanged during a space of fifteen centuries. It must be allowed that the *Trifolium repens* more nearly resembles the *Oxalis* than does the *Minus*. Is it then too much to suppose that when the *Oxalis* became more scarce, the *Repens* was chosen; and that at a still later period the *Minus* became the favourite on account of its being perhaps the commoner, if not from its superior beauty? Your correspondent of the June number, in supporting the *Trifolium minus*, confined himself entirely to the usage of the present day; but, as I take it, the point in dispute has reference to the identical trefoil used by St. Patrick, and not to the plant now in use. I should be glad to know if any of your readers could give any instances of the *Oxalis* ever having been worn in honour of St. Patrick. I should also like to know if there are any ancient records of "wearing the shamrock" in past ages, or whether it has simply been a traditionary usage.—*R. F.*

Notes of the Seasons for Cushendun, Co. Antrim.—*Swallows* seen April 18th, 1867; April 25th, 1868; April 12th, 1869. *Cuckoo*, April 27th, 1867; April 25th, 1868; April 23rd, 1869. *Corncrake*, May 3rd, 1867; May 2nd, 1868; April 24th, 1869. *Willow Wren*, May 4th, 1867; April 26th, 1868; April 18th, 1869.—*Rev. S. A. Brenan, M.R.D.S.*

The Shamrock, Mistletoe, and Palm Branch.—The identification of real objects that have served as sacred or national emblems will always be of interest. 1. With regard to the Shamrock, I may mention, that when in the West of Ireland some few years since, I visited a bazaar, or fancy fair, held for some charitable purpose by the upper class in their county town. Some of the presiding ladies very courteously tendered me a sprig of the *true* Shamrock; this was in some sort official, and most certainly it was the large-leaved trefoil, having a beautiful purple spot in each leaflet, which your correspondent "H. N.," writing from Oscott, identifies as *Trifolium repens*. Such also have I seen in London greenhouses under the same character. 2. The mistletoe has been much discussed of late in France and Switzerland, as well as in England. I see no reason to doubt the conclusion of our old antiquaries, that our Mistletoe is the *viscum* of Pliny and Ovid, who both connect it with Druidical worship. Its traditional reputation has come down to us with such unvarying certainty that nothing short of a physical impossibility should nullify the report. The Mistletoe is found upon the oak. The question of its scarcity or its abundance is quite of secondary importance. 3. The Palm-branch. Thousands of unsophisticated individuals descend to the grave under the full impression that they have assisted at our national church festival with a branch of *real* palm in their hands, which, however, is no more than willow or ash; waggon-loads of these saplings reach the metropolis every year at Easter, cut, as I am informed, chiefly on the marshy banks of the Lower Thames. Such branches, in their green state, with little tufts of blossom spread at intervals towards the gracefully curving apex, figure in processions along the aisles of our churches, as *real* palm. The effect is pretty; they are suitable, and may be obtained at a cheap rate in this country, where the true palm is an exotic. It appears that in England during the period of Roman Catholic ascendancy, the *Salix caprea* and *S. cinerea*, called Sallows, were generally used for this purpose; though box and yew were sometimes substituted. The date-palm (*Phœnix dactylifera*), once very common in Palestine, is now very rare, but is largely cultivated in Spain, South of France, Italy, and Sicily, for this purpose. Travellers report that Palma Christi (*Ricinus communis*) is cultivated in Palestine chiefly as a garden shrub.—*P. N. R.*

The American Association for the Advancement of Science has announced its eighteenth meeting to be held at Salem, commencing on the 18th of August. A special circular has been addressed to persons interested in the microscope, announcing that, in order to give encouragement to the general and increasing interest in the use of the microscope, rooms will be provided for the display of microscopes and microscopical apparatus. It is intended to have as complete a collection as possible of instruments of both American and foreign manufacture. The objects of this exhibition will be to assist the progress of scientific research, by social intercourse and a full comparison and discussion of whatever is new and important in microscopical investigation, and to encourage the manufacture and use of this valuable instrument.

Small Lapwing's Eggs.—The egg described by "J. H. A." is, in my experience, unprecedentedly small. I have one a quarter of an inch larger, which I thought a wonder for a wader's egg. The companion egg is the full size: they were taken from a nest of four, very near the Devil's Dyke, Brighton, June 1863. They were found by a farmer of that locality. The small egg is extremely richly marked, all the colouring matter of a large egg being concentrated upon it. In size and shape it is exactly that of a Pratincole or Black Tern's egg, whereas your correspondent's, so far as I can gather from his description, is of the usual form. I instanced my egg, and exhibited it before the British Association at Birmingham, as an example of remarkable aberration in form in an egg.—*C. O. G. Napier.*

Cat Barometers.—The only folk-lore that I can recollect connected with cats and their supposed knowledge of the weather, is, that when a certain black cat of ours used to appear more than usually lazy, and a fixture on the hearthrug by the nursery fire, our old nurse used to say, "We are going to have windy weather!" And it really is true that often and often there were severe gales within less than six hours of the sage prediction, but I never noticed that cats exhibited any erratic propensities on such occasions. I have heard that pigs run about in windy weather, and the reason given me as a child was that pigs could *see* the wind. I know a brown cat of mine always exhibited a strong propensity for sharpening her claws in the leather-covered cushions of my dining-room chairs, but it never struck me that any atmospherical disturbance followed this most destructive proceeding of poor brownie's.—*Helen E. Watney.*

Serin Finch.—*Land and Water*, p. 392, records the appearance of another Serin (*Serinus meridionalis*) in Britain. It was shot in the neighbourhood of Worthing.

NOTICES TO CORRESPONDENTS.

L. F. R.—We cannot attempt to name unless you send specimen.

C. L. C.—The object sent some time since has now proved to be the eggs of a moth. The hairy little caterpillars we have no leisure to rear so as to determine the species. It is probably allied to the "Lackey."

R. H. A.—We cannot attempt to name from such uncharacteristic fragments. No. 2 is *Sertularia polyzonias*.

A. S.—We cannot attempt to name seedling ferns from fronds or fragments without fruit.

C. B. H. desires to record the appearance of the Painted Lady (*Vanessa Cardui*) near Belgrave Square, London.

R. H. F.—We know of no "dictionary of insects." The best substitute would be a good practical entomologist.

DREISSENA.—At page 123, line 29, for "Neone" read "Nene;" line 45, for "ganglia" read "ganglion;" page 124, for "branchiala" read "branchial or."—*T. G. P.*

W. E.—Bryant's "Flora Dietetica" is an old book, and may often be found on old bookstalls, and purchased for a shilling or two.

W. R.—Let them do it, because it is only a natural act.

G. B.—No. 1. *Hypnum velutinum*. 2. *H. prælongum*. 3. *H. serpens*. 4. *H. commutatum*. Don't send so many again. —*R. B.*

H. E. W.—Galls produced by an insect.

H. H. M.—Probably Dr. Murie's paper on the Classification of Microscopical Objects would suit your purpose. It is published in No. 2 of the *Monthly Microscopical Journal* (Hardwicke).

W. G.—The lichen sent is *Cladonia coccifera*, variety *macilenta*.—*W. C.*

S. S.—*Geranium lucidum*.—*B.*

W. C. T. (Oporto).—*Aspidium* (*Polystichum*) *aculeatum*, Swz.; and *Pteris arguta*, Ait.—*J. G. B.*

A. J. D.—By no means an uncommon occurrence.

M. C., Kent.—We cannot recommend such a portable book on marine shells as you require. Perhaps some correspondent can name a recent Flora of Normandy and Brittany.

J. S.—The very common "red rust."

F. S. (Rugeley) requires J. Strale, or Heale's address. Letter sent to 6, Brewer Street, returned "not known."

A. H. M.—An undoubted variety of *Lasiommata Megæra*.

A. S. R. (Montreal).—The supposed fungus on legs of *Papilio asterias* is not a fungus at all, but pollen masses from some species of *Orchis*. See Darwin on "Fertilization of Orchids."

E. C.—Your beetle is *Liodes humeralis*, the commonest member of the *Anisotomidæ*. It is not unfrequently found in the South of England in fungoid matter, but becomes more abundant towards the north, where it is often seen in considerable numbers. The male is more shining and has more robust limbs than the female.—*E. C. R.*

F. B.—We can find no fungus, and no black spots, and nothing abnormal in your *Stellaria*. Something like insect exuvia in the box.

R. H.—The Wood Spurge (*Euphorbia amygdaloides*), as far as can be determined from the fragment without leaves.

D. H. S.—The "Micrographic Dictionary," article "Œdogonium," contains all the particulars we have seen in English of the process of fertilization.

W. J.—A very slight examination would have convinced any one that your plant is *Secale* and not *Hordeum*.

F. G., Seaforth.—The two dipterous insects appear to be *Bibio Marci*.—*C. O. W.*

J. B. B.—The wasp is *Vespa Germanica*.—*C. O. W.*

B. T.—Leaf galls.

H. B. P. N.—No. 1. *Vitis*, species indeterminable. 2. *Ptelæa trifoliata*. 3. *Actæa* or *Cimicifuga*.—*J. G. B.*

E. W.—No. 100. *Aspidium aculeatum* (typical). 101. *Aspidium aculeatum*, var. *angulare*. 102. *Pteris arguta*. 103. *Nephrodium Filix mas*.—*J. G. B.*

EXCHANGES.

MOSQUITOES from the United States (mounted) offered in exchange for any other good entomological objects, slide for slide.—A. P., care of the Editor.

PAULOWNIA IMPERIALIS.—Seeds for distribution.—Send stamped and addressed envelope to "Oporto," care of the Editor.

MARINE DIATOMS (unmounted) from North Shore, Whitehaven, in exchange for a little French's Pond deposit. A stamped and directed envelope will secure a little Embryo of Oyster.—W. Gurnburn, 5, Rosemary Lane, Whitehaven.

SPONGILLA FLUVIATILIS.—Birotulate spicules mounted, in exchange for *good* mounted objects, entomological preferred. —"Portland," care of the Editor.

BRITISH BIRDS' EGGS.—North Country Birds' Eggs in exchange for South Country Eggs.—Send list to Alfred Pickard, Wolsingham, Darlington.

CORNISH PLANTS (dried) for others, especially from East and South of England and West and South of Ireland.—Send lists to R. V. T., Withiel, Bodmin, Cornwall.

MINERALS offered for other objects.—Address, W., No. 1, St. Paul's Terrace, Chichester.

ROYAL FERN and BEECH FERN in exchange for British Moths and Butterflies.—R. Higson, 34, Friargate, Preston, Lancashire.

GIZZARDS OF CRICKET (mounted opaque for binocular) for good Marine Diatoms (mounted or unmounted).—G. Moore, Dereham Road, Norwich.

DIATOMACEOUS DEPOSITS from—French's Pond, Albany, Maine; Duck Pond, Waterford, Maine; Cherryfield, Maine; Stockhoe Hill, Richmond, Virginia; French Garden Hill, near Richmond, Virginia.—Sample (unmounted) of any of the above for a good mounted object.—E. C. B., care of the Editor.

FORAMINIFERA FROM TENBY, S.W. — Send a stamped directed envelope to John Humphreys, Cheltenham Branch Dispensary.

COTYLEDON UMBILICUS in exchange for similar plants.—John Wilson, 4, Meadow View, Whitehaven.

SHELLS, Feathers of Indian Birds, &c., offered for British Mosses.—E. C. Jellie, Foley Cottage, Redland, Bristol.

FOREIGN LAND SHELLS offered for British Land and Marine Shells. Thomas Ball, Brigg, Lincolnshire.

SPECIMENS of best Scottish, Alpine, West of Scotland, and other rare British Flowering Plants will be given in exchange for specimens of South of England or Midland Counties Plants.—Lists sent to Rev. John Pagan, Bothwell Manse, Lanarkshire.

BOOKS RECEIVED.

"The Gardener's Magazine." Part XLII. June, 1869. London: E. W. Allen.

"The Dental Register." April, 1869. Cincinnati: Wrightson & Co.

"Scientific Opinion." Part VII. June, 1869. London: Wyman & Sons.

"The Monthly Microscopical Journal." No. VI. June, 1869. London: Robert Hardwicke.

"Land and Water." Nos. 175, 176, 177. London: 169, Fleet Street.

"The Canadian Entomologist." No. 10. Entomological Society of Canada.

"The Action of Anæsthetics on the Blood Corpuscles," by J. H. M'Quillen, M.D., Professor of Physiology in Philadelphia Dental College. Reprinted from *Dental Cosmos*, March, 1869.

"The Disinfectant Question;" Review of a Book by Dr. Angus Smith, entitled "Disinfectants and Disinfection." London: M'Corquodale & Co.

"Le Naturaliste Canadien." No. 6. Mai, 1869. Quebec: 8, rue de la Montagne.

"The Quarterly Journal of the Folkstone Natural History Society." No. 3. June, 1869.

"The American Entomologist." Nos. 9 and 10. May and June, 1869 (No. 8 *not* received). St. Louis, Mo.: R. P. Studley & Co.

"The Lepidopterist's Guide, intended for the Use of the Young Collector: containing full instructions for the Collecting, Management, Observation, and Preservation of Lepidoptera, in all their Stages," by H. Guard Knaggs, M.D., F.L.S. London: Van Voorst.

"The American Naturalist." Vol. III., No. 4. June, 1869. Salem: Peabody, Academy of Science.

COMMUNICATIONS RECEIVED.—D. H. S.—J. C.—F. T. M. —G. G.—R. V. T.—E. T. S.—J. B.—A. P.—J. G. O.—C. E. F. —C. B. H.—F. V. P.—T. G. P. -W. C. T.—S. S.—S. A. S.— W. G.—F. T.—S.—J. C. W.—J. W. G.—J. K. P.—J. Y. H.— A. H.—P. N. R.—F. C. S. R.—W. E.—J. C.—H. C. L.—Mrs. S.—W. B. L.—R. H. F.—F. G. M.—H. H. M.—T. S.—E. A. S. —J. R.—H. E. W.—E. C. R.—A. S.—H. C.—R. H.—H. L. M. —W. H.—T. S.—J. G. O.—M. D.—J. R. W. H.—F. W. W.— G. M.—L. F. R.—R. G.—R. F.—J. S.—H. B.—M. C.—W. S. —H. N. O.—E. J. J.—J. H.—S. A. B.—F. C. H.—J. H.— A. J. D.—F. S. T.—A. H. I.—T. B.—A. G.—E. C. J.—A. A.— W. J.—E. A. N.—J. W.—A. S. R.—J. H.—J. P.—F. H. L.— W. B.

THE CULTIVATION AND IMPROVEMENT OF WILD FLOWERS FOR GARDEN DECORATION.

JUST as if we had not plenty of flowers already in our gardens! Why, our flower-beds glow with gems from every part of the world; and, surely, these are gay enough and varied enough to please the most fastidious. What more do we want? And then, how presumptuous to talk of the "*improvement*" of wild flowers. As if the

"Primrose stars in shadowy grass,"

that deck the hedge-banks in spring; or the

"Daisies pied, and Violets blue,
And Lady-smocks all silver white,
And Cuckoo-buds of golden hue,"

that

"Paint the meadows with delight,"

and all the bright blossoms that light up the woods with their beauty, could by any possibility be made more lovely than we find them! Well, I have known and loved them all too long to wish them other than they are in their native haunts. I think one of the finest floral sights I know is a wood carpeted with sylvan Forget-me-nots, such as we have here in the north, and I would rather go miles to see it than to see a fashionable floral device of Perilla, Geranium, and Calceolaria, with variegated walks of brickdust, slate-chippings, and pounded shells. I think a hedge-bank dotted over with the bright flowers of *Geranium Robertianum* or *Lychnis dioica*, or blue with *Veronica Chamædrys*—"Angel's Eyes" and "Bonnie Bird Een"—as our simple country folk so lovingly call it—is one of the prettiest sights one can see. I only want to "improve" flowers for *garden decoration;* and here, I think, there is no question but that even the Forget-me-not and the Geranium, if transplanted into a garden, would suffer by comparison with some of their more showy neighbours. In such a situation, the Forget-me-not would not be any less beautiful if the flowers were double the size, or the Geranium if it had three times as many blossoms.

But a great many of our favourite *garden* plants have been improved, and are very different from their original wild forms. The hybrid *Pelargoniums*, that make such a show in our conservatories, are very different from, and much more beautiful than, the few narrow-leaved species that one sees figured in the early numbers of Curtis's *Botanical Magazine* of eighty years ago. Most of the splendid Fuchsias have been "improved" from the old-fashioned *F. coccinea* and *F. globosa*—lovely plants in their way—but not to be compared with the grand flowers that have been derived from them. The old Heartsease, Shakespeare's "Love in Idleness," is so pretty a little flower, that all sorts of loving names have been given to it, and it is one of the best plants for a rockery that I know; but it can scarcely vie with the gorgeous, velvety Pansies that one admires so much at a flower-show. "A noble savage" is very interesting in his own prairies, but an educated gentleman is a pleasanter companion than the noblest savage that ever painted his face or danced a war-dance; and I think that, just as we educate a man to make him fit for civilized society, so when we bring wild flowers into civilized places, they are none the worse for a little education and refinement.

But what need is there to cultivate them and improve them at all, seeing that we have already sufficient for all our requirements? It is just because I think that there *is* room for more that I am writing this chapter: just because I think that though there are a great many exotic bedding plants, quite beau-

tiful enough, no doubt, but which require so much trouble and expense to keep through the winter, or to raise in the spring, as to be almost out of the reach of people who cannot afford to keep a gardener, that I am trying to induce some of my fellow-readers and correspondents to adopt my hobby, and to try if they cannot raise and introduce some new plants, that shall have as good an effect as many of our tender exotics, and yet be so perfectly hardy that in many cases they will be green and pretty even in winter, and the only cultivation required will be to weed them, and to pull up the superabundant growth. I do not suppose that we can ever obtain scarlets like the Geranium, or vivid crimson like Crimson Flax from any of our wild flowers—and for these colours we must always depend upon exotics—but we have plenty of good blues, yellows, and pinks to work upon, and from these some very pretty effects may be obtained. I see no reason why we should not get a strain of *Prunella vulgaris*, for instance, that shall have every floret three-quarters of an inch long, instead of one-third that size; that shall flower densely for three or four months in succession; and shall vary to purple, lavender, mauve, pink, and white. I think such a flower as this would be considered an acquisition as an edging plant. Then what a sea of gold could be produced from large masses of *Lotus corniculatus*, if the flower were enlarged, and the plant made less straggling in its growth. No doubt most of my readers have noticed that the buds of this flower are tipped with crimson before they expand, and that they sometimes change to an orange-colour before they acquire their permanent yellow hue. I have seen a few plants which retain this orange, or rather cupreous, tint in the flowers until they fade. I am now trying to propagate such a plant, and I hope to obtain after a while a flower which will have all the effect of the very pretty *Mimulus cupreus*.

Viola lutea is a lovely little yellow Pansy, quite common in many mountainous districts, which has already been introduced, within the last few years, and now may be bought from most seedsmen. It is very plentiful on the hills which join Cheshire and Derbyshire, and I find that it varies much in the colour, shape, and size of its flowers. Some are primrose, others golden-yellow. Some have strong black lines in the lower petal, others are but faintly pencilled, so that this plant is evidently capable of considerable change, and a good strain would be readily obtained. It is a charming bedding plant, and would make a beautiful edge to a central clump of the blue *Viola cornuta*. On the banks of the Tyne, in Northumberland, I have seen it varying to purple; and I rather fancy this variety is more robust than the yellow; the two would mix with good effect.

Sometimes our wild plants produce seedlings with prettily variegated foliage. There is a variegated Meadow-sweet occasionally seen in gardens, which is remarkably good, and which makes a handsome plant for the front of a shrubbery border. Every leaflet has a centre of yellow, which is reproduced on every part of the plant with great regularity. The variegated form of *Mentha rotundifolia* has long been a favourite in gardens; and there are others which with some pains being taken might be made more useful. The year before last, I found a plant of *Veronica Chamædrys*, of which one solitary spray had sported, and bore cream-coloured leaves. I struck this branch and obtained a plant, which in a short time threw out several beautifully variegated sprays amongst the green ones. These were again struck, and I obtained a great many plants which were variegated; but all my plants when left to grow large reverted in a great measure to the original green colour. Last year was so dry that I could not very well go on with the education of my plants, but this year I have been very successful, and I find that in each successive generation the tendency to revert to green is diminished. These variegated Speedwells are remarkably pretty, and the contrast between the blue flowers and the gilded leaves is very good. No doubt seedlings from these plants would be of a still more permanent character.

In one of the later numbers of Science-Gossip Mr. Britten mentioned having found a green-and-white striped Plantain. It was very pretty, and I hoped to have been able to propagate it, but an unfortunate hen scratched it up this spring (the order Rasores is one of the troubles of my life), and it was dried up before I found out the mischief.

One of the prettiest and most successful bedding plants I have tried is *Geranium lucidum*. It has a great many advantages. It is an annual, and sows itself, so that the young plants come up in the autumn, where they may either be left till spring, or pricked out where they are to grow, and as they remain green through the winter, the bed always looks cheerful. They should be planted five or six inches apart. It begins to flower about the end of April, and very soon forms a mass of brilliant, glossy, but pale green foliage, dotted over with bright pink flowers. Its great advantage is that it will grow in the densest shade, where it is very difficult to find anything else that will thrive. I have now a bed of it under a thick purple Beech, which is still (June 25th) in perfection, though this year it came out a week earlier than usual. It is as solid and compact as *Saponaria calabrica*, and the foliage is far handsomer. It will be over, as far as beauty goes, by the middle of July, when in open situations there would be ample time to put in a few Scarlet Geraniums, or Stocks, or Wallflowers for next spring. It bears moving well, and may even be transplanted when in full flower. So little trouble is required to grow it well, that my bed has

actually not been dug over since the autumn of 1867, when I pricked in my first plants. Last autumn the young seedlings came up a fortnight after I had pulled up the old plants; and as they completely hid the ground, I left them. I have it also growing in a bed of Standard Rose-trees, where it is very luxuriant, and serves to hide the naked stocks. The great fault of *Geranium lucidum* is that the flowers are not quite sufficiently numerous; but by careful selection, it is quite possible that a floribund variety might be obtained; probably also a white variety.

Many of our wild flowers are so pretty that I am quite sure they only want introducing into gardens to be appreciated, needing no improvement. *Myosotis sylvatica* is already a favourite, and is admitted into very "swell" gardens now; but I have seen it grown in cottage gardens ever since I was a boy. It contrasts admirably with Woodruff (*Asperula odorata*). A beautiful early spring bed would be a centre of Yellow Dead-nettle (*Galeobdolon luteum*); next, a ring of Purple Orchis, then one of Woodruff, the whole surrounded by Forget-me-nots. These might alternate with later plants to succeed them (after the manner of "Hornby Mills Garden" so pleasantly described by Henry Kingsley*), in which Campanulas, Foxglove, Golden Rod, Speedwell, Geraniums of various kinds, Chrysanthemums, and many others—some or all of them—might play their parts.

The best way to begin to improve wild flowers would be collect the seeds of any that are fixed upon as likely subjects, during the autumn. When this seed is sown in good rich soil, especially if it be quite different from its native soil,—as, for instance, bringing seed from chalk to sandstone, and *vice versâ*—there is great probability of some change taking place. Most plants are enlarged and improved by successive growth in richer soil, but many varieties may be raised as well. If any variety is deemed worth perpetuating and intensifying, the proper way is to pull up every other plant of the kind, so that it may not be impregnated with the undesirable varieties, and to save seed from that plant only. The chances are that next year the seed will produce a considerable number of plants of the desired variety, *some* of which will be more fully developed than the parent. These must in like manner be selected, destroying all others, and at last permanent varieties, often very unlike the original, are formed. Plants are very pliant in the hands of the skilful floriculturist, and there is no saying what curious changes may be induced by careful selection; but time and patience are required.

It is rather curious, however, to find, when we look over a catalogue of British plants, how many there are that already serve to adorn our gardens some that could not very well be spared; such as Sweet Violets, Wallflowers, and Lily of the Valley Golden Ball, Columbine, Broom, London Pride, Periwinkle, Jacob's Ladder, Primroses and Cowslips, Thrift, Mezereon and Fritillary, are all wild English plants, and are all constantly seen in gardens.

I can count up nearly one hundred and fifty wild plants that I have seen in cultivation. Many of these, like Monkshood, Rose of Sharon, Evening Primrose, Borage, and Snowdrops, are questionable natives; and I have no doubt that some have originally escaped from gardens, especially such as were likely to have been cultivated, because they possessed strong medicinal qualities, and have become wild. Some are grown in their natural wild condition, but many are only admitted into gardens when they have become double, like Lady's Smock, Anemone, and Marsh Marigold, or when they have variegated leaves like the cultivated form of Coltsfoot.

Some of the following plants seem to me to be particularly suitable for cultivation or improvement.

Anemone nemorosa, especially a delicate blue variety that is sometimes found.

Viola sylvatica, var. *Riviniana*, the flowers being large and numerous.

Polygala vulgaris, an intense blue, but the flowers would require to be greatly increased in size. Varies to white and pink.

Genista tinctoria, as handsome a plant as the greenhouse lemon-scented Cytisus.

Vicia sylvatica, a very elegant climbing plant.

Vicia Cracca.

Prunus Padus, the Bird Cherry. This *is* sometimes planted; it is one of the most beautiful flowering shrubs that grows.

Potentilla Anserina, leaves and flowers both handsome.

Potentilla Tormentilla, flowers capable of great enlargement, and very prone to become double.

Chrysanthemum leucanthemum. Several annual Chrysanthemums of this character of flower have of late been introduced into the seedsmen's lists, but I have not yet seen one to compare with our wild plant.

Jasione montana.

Euphrasia officinalis, Eyebright. This little plant grows in the form of a pretty miniature shrub. There is a lilac variety, which is very pretty.

I hope these few remarks and hints that I have written may induce some of the readers of SCIENCE-GOSSIP to begin working at a subject which, if it should lead to no *practical* results, has, at any rate, the merit of a little novelty. But wild plants under cultivation are sure to undergo *some* curious changes, and the observation of these can scarcely fail to be of scientific interest.

ROBERT HOLLAND.

* *Argosy*, vol. i. p. 394.

A HANDFUL OF GRASSES.

TO the lover of Nature all her products are interesting, and he is but an indifferent observer who cannot draw a lesson from the meanest of God's creatures.

I have before me now a number of coloured illustrations of British Grasses made from living specimens during the year 1866. Perhaps five minutes' chat about their originals may not prove unacceptable to some of our gossiping friends.

Among our commoner and more striking grasses are the Foxtails (*Alopecurus*), a well-marked genus. As the names, both popular and scientific, indicate, the plants of this genus have much the appearance, in miniature, of foxtails in their inflorescence. The florets form a long cylindrical densely-crowded spike. They are much flattened, and bear but one flower.



Fig. 123. Slender Foxtail (*Alopecurus agrestis*).

Of the four species into which Mr. Bentham divides the British members of this genus three, I find, are abundant here; viz. *Alopecurus agrestis*, *A. geniculatus*, and *A. pratensis*. The two last have a considerable resemblance to each other, but confusion between them is less likely to occur in consequence of their different habitats; the one inhabiting marshy lands and half-dry ponds, the other more frequently dry or upland pastures.

The Slender Foxtail (*Alopecurus agrestis*) in this locality appears to be the least common species. The specimen from which our figure was drawn was plucked on St. Mary's Island, an extensive marsh now forming the extensive works



Fig. 124. Floret of *Alopecurus agrestis*, magnified.

of the Chatham dockyard. It was formerly separated from the mainland by a creek navigable at high tide. I have found several rare and interesting plants upon it. But to return to our grass. It is a tall straggling plant, with but small pretensions to beauty, growing upwards of a foot high. Its leaves are broad, short, and rough, with long rather close sheaths. The culm, or straw, is generally more or less decumbent at the base, and often geniculate at the nodes. The spike is long and very slender (Fig. 123), of a purplish

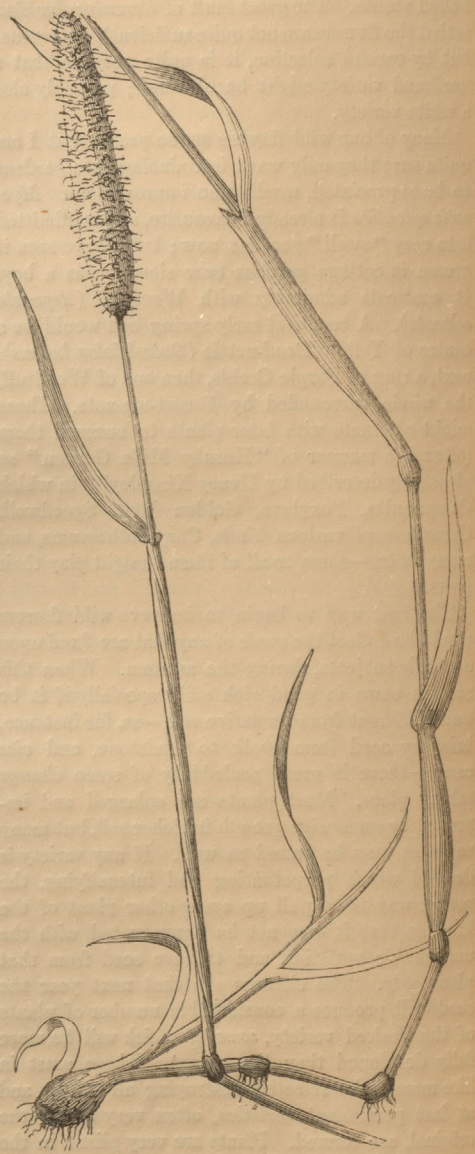


Fig. 125. Marsh Foxtail (*Alopecurus geniculatus*).

hue; its florets, less closely imbricate than those of the other species, are about three lines long; the outer barren glumes are awnless and cleft to the middle; the inner flowering glumes bear an awn, which projects two or three lines. Fig. 124 represents a floret much magnified. Our next species, the

Marsh Foxtail (*Alopecurus geniculatus*), Fig. 125, is a highly ornamental grass, especially when seen in full flower lifting its richly-adorned head above the surface of the clear transparent waters of some tree-shaded pond. "A thing of beauty is a joy for ever." Well do I remember the pleasure I experienced from such a sight at High Halstow. There is near the village church a small pool of water in which it grows most profusely and shows itself to great advantage. At the time of the visit alluded to, the pond was thickly dotted with its rich white and flesh-coloured heads, and was really pretty. As a glance at Fig. 125, taken from a plant growing on St. Mary's Island will show, the specific name, *geniculatus*, is most appropriate, as the stem is bent or kneed at every purple joint or node. From many of the lower nodes spring adventitious roots. Its leaves are short, broad, and pointed, having much looser sheaths than have those of the Slender Foxtail. Our figure will assist in identifying the plant. Fig. 126 represents a magnified floret.

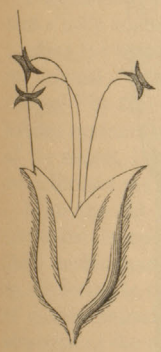


Fig. 126. Floret of *Alopecurus geniculatus*.



Fig. 127. Floret of *Holcus*.

The Meadow Foxtail (*Alopecurus pratensis*) may be recognized at once from its close resemblance to the Marsh Foxtail, from which it differs in its more erect manner of growth in having larger, thicker, and more obtuse spikes, larger spikelets, and longer awns.



Fig. 128. Floret of *Holcus* divested of the outer glumes.

Few persons can have wandered through a field of ripe grass without being struck by the beauty of a soft, silky-looking grass of a white or light red colour, growing in compact masses among various other kinds. It is the soft Meadow-grass *Holcus*. This very ornamental genus is limited in Britain to two doubtful species, differing from each other chiefly in the length of the awn and in the amount of hair clothing the leaves and stem. The panicle when in full flower is widely spreading; before flowering and at night it is much more erect. The florets (Fig. 127) are two-flowered; the upper and smaller flower, which bears an awn, barren; the lower awnless and fertile. Fig. 128 represents a floret of *Holcus* divested of the outer glumes.

Brome Grass (*Bromus*). This is a large but natural genus containing many ornamental grasses that are both widely spread and abundant in Britain. As these plants bear a strong family likeness to each other, a knowledge of one or two of them will with a little study lead to the recognition of the remainder. We will take for our first example the Barren Brome (*Bromus sterilis*), Fig. 130, than which there are few or none more elegant and graceful. To judge correctly of its pretensions to beauty, it must not be seen where it frequently grows,—on the banks of the dusty highway. It possesses great capacity for collecting dust, and in such situations is often almost an invisible green. To see it as we would have it seen, it is necessary



Fig. 129. Common Rye-grass (*Lolium perenne*).

to wander along some grass-grown, elm-shaded country lane where there is no traffic and but little dust. It grows to the height of two feet or more, with soft, downy leaves. The spikelets (Fig. 130 *a*) are seated on long slender pedicels, and hang in most graceful curves. Each spikelet contains about seven compressed flowers. Their long slender awns give to the whole plant a light, feathery appearance, which greatly enhances its beauty. This grass won my admiration years before I was able to give it "a

local habitation or a name." Fig. 130 *b* represents a flowering glume.

Upright Brome (*Bromus erectus*) is another species extremely pretty when in full flower, with its rich yellow stamens, like so many golden tassels hanging glittering in the rays of the setting sun: but perhaps none are prettier than the upright annual Brome (*B. madritensis*), which is, however, somewhat less common than the foregoing.



Fig. 130. Barren Brome-grass (*Bromus sterilis*). *a*, Spikelets; *b*, Flowering glume.

Another common and easily recognized genus of grass is the Darnel or Rye-grass (*Lolium*), containing, according to Bentham two, according to Withering three, British species.

Common Rye-grass (*Lolium perenne*), Fig. 129, is a very common grass growing abundantly everywhere. The culm is somewhat decumbent at the base, round and smooth, with tumid purple nodes. Its leaves are narrow, pointed, and striated; spikelets widely separated, alternate and sessile, with their edges or back of glumes turned towards the rachis. This grass, like most plants, varies greatly according to nature of soil, &c.

Bearded Darnel (*Lolium temulentum*), which differs but little in general appearance from the above, is supposed by some to be the *tare* of Scripture. Its seeds are said to produce intoxication and even fatal convulsions.

St. Mary's Vale, Chatham. J. Hepworth.

A "SARMENT" IN A SUSSEX STONE-PIT.

By Henry L. Watts, M.A., Ph.D.

SOME time back, while making a geological expedition in the above-named county, I visited a stone-quarry which had then been recently opened for the purpose of obtaining materials for the erection of a large building in the neighbourhood, and watched with much interest the operations of the men employed in it, as, with their picks, wedges, sledge-hammers, and crowbars, they toiled at the rigid substance they sought to remove from its rocky bed. These men, to the number of eighteen or twenty, were not only entirely ignorant of the word "geology," but testified their rustic wonderment that I should spend my time in looking on so eagerly as they drove their wedges into the stony layers, and should watch with such "deediness," as they called it, each fracture they made in the ponderous masses around them.

I occasionally worked with them, whenever I saw that a little addition of muscular force was needed to effect the translocation of a piece of rock from its original "situs," and therefore, as these men worked "by the piece," that is, were paid by the cubical contents of what they obtained for the use of the mason, I was looked upon as no unwelcome intruder into the province of their labours.

With the aid of my pocket microscope I soon succeeded in opening to some extent the eyes of their understandings to the purpose of my visit, by disclosing to them the fossil remains of myriads of minute animals that had lived before the construction of the rocky tombs in which, while living, they had been deposited. There they were, exhibiting the same integrity of form possessed by them in life, and the same brightness of enamel upon the surface of their shelly habitations, although countless thousands of years had passed away since, by the sexton hand of Nature, they had thus become entombed in earth, and therein had been so well preserved.

It was on a subsequent day, on my revisiting the quarry at the hour of noon, when the labourers had thrown down their implements of toil, and taken out their pocket-knives, and were disintegrating comparatively huge lumps of fat pork and genuine home-made bread, that one or two of them came towards me, telling me that they had found that morning something which they thought "looked very much like the leg-bone of some big animal."

I knew that this quarry was located in what is recognized by geologists as a part of the country of the Iguanodon, and therefore when I came up to the spot where this fossil relic was lying, I expressed no astonishment at the sight, as my companions pointed it out and informed me that they "thought it best to let it bide as it was, just as they lighted on it."

"You were quite right!" was my reply. It was, indeed, the fossil petrifaction of the "bone of some big animal," as the men had said. It was the femur of a large iguanodon. The length of it was about two feet and a half, horizontally half-imbedded in the sandstone or its rocky matrix.

As I sat upon a large stone close by, all the other men had closely encompassed me, the chins of some of them resting on the shoulders of others, while several jaws were still engaged in masticating bread and fat pork. One of the two who first came up to me on my entering into the quarry, being somewhat more of a *savant* than the rest, ventured to ask me the question whether "that 'ere bone didn't belong to one of they hanimals what was drownded in the flood?"

Here was a question I felt myself called upon to answer, and thus was I drawn in to give an improvised geological lecture or sermon.

If I had not a very intelligent audience, I was perfectly aware that several of them were much interested in the subject of my discourse, as it then was lying to view before them. The place in which we were, presented one of the best lecture-rooms for the geologist in which it has ever been my lot to discuss telluric phenomena, or the natural history of the earth, as recorded on the pages of the great Stone-book of Nature. I had no difficulty in convincing my audience of the gradual formation of the aqueous or sandstone rocks by the slow deposit of loose soil or sand by the agency or action of water. The parallel lines of stratification, as marked in the leaves of a portion of that volume opened around us, were diagrams most clearly demonstrative of this great physical fact. My audience more and more clustered around me, eager to catch every word that fell from my lips, as though I had been a messenger from some other and far-distant world, to declare to them truths that before had been so long concealed from them.

"Dang it!" said one of my auditors, "any chap can see this now with half an eye," turning round to his fellow quarrymen, and continuing his remarks, as the truth came upon his mind, like a gladdening flow of light into that which had been previously obscured.

"Why all this here rock has once been loose sile, washed down by water from the hills and uplands, else how could these bones be found in the stone if they hadn't been afore the loose sand had comed to be formed into hard rock?"

"But," said one of his comrades, "didn't you, Jack, say that this here bone belonged to one of them 'ere hanimals what was drownded at Noer's deluge? If it was, where's t'other part of the body; for when it sunk and got kivered over with sich a sight o' mud, while the flood lasted, and all that 'ere

mud comed atervards to be changed into hard rock, as we see it is, and no mistake about it, as our tools purty well knows—why don't we find the whole hanimal, or the skilleton on it, where we've turned up this here leg? That's what I wants to know!"

I here perceived that doubts had been stirred up within the minds of some of my most thoughtful "brethren" by what I had already introduced for their consideration, and, as they turned to me for my opinion, whereby these same doubts might be cleared away, I at once declared to them the deluge or flood to which reference had been made had had nothing to do with the phenomenon or physical fact before us. I proceeded to prove to them, by reference to well-established truths, that for countless centuries of years before man became involved in the naturally progressive order of animal existence, the earth's surface had undergone innumerable changes by upheavals and depressions, caused by the violent action of the earth's internal heat. These disturbing processes would necessarily occasion as many partial inundations or deluges; so that, in the course of time, the portions of the land and water surfaces of the earth would be made to change places with one another, and *that* many, many times during the long tract of millions of years. I reminded them, by an appeal to visible facts, that the same process of translocation was at the present moment going forward, although more slowly in its action in these our temperate climes than in or near the tropical regions of the earth, where volcanoes are numerous and earthquakes more frequent and violent. The earth also, when much younger than now, must have exhibited greater and more sudden changes in its constitution and external or surface character than in its more advanced age, just like a young animal, that in its actions gives proof of much freakishness and changeableness of disposition or temper. I also convinced them, by the testimony of the rocks, that in the whole animal world there had ever been, even as now, destructive warfare therein regnant or prevailing, as well as natural decay and death, or, in other words, more philosophical and true, constant change or creation, and this from the beginning of the earth, or for myriads of years preceding the human era.

The relic of the animal or reptile then lying before them, belonging to a monster race—here I drew with a piece of chalk on the back of a shovel the picture of the Iguanodon,—had become an extinct type for many ages anterior to that in which man began to appear as a higher organized animal. I showed also to them that these two orders of existence—the gigantic reptilian and the human—could not have been contemporaneous, by reason of the earth's climate and its vegetable productions, which, while being in their nature necessarily consistent with that of the one, would be incongruous or uncongenial with that of the other.

From what I had already told them, they were prepared for my explanation for the finding of this isolated fossil bone. There was no need for my telling them that the animal had died at some time or other, and in the inquest we were holding upon the part of the body then lying before us, there was that absence of circumstantial facts which might have been adduced as evidence as to whether the "individual" met his death by violence, practised upon him by some other animal or other animals, whether it was occasioned by an act of *felo de se*, or whether his decease was the effect of old age or natural decay. No other verdict could therefore be arrived at, but that where the creature died, the body very possibly continued to lie, until all that was inconsumable by beast, bird, and insect—the skeleton form—was thus left to be bleached by the sun, the wind, and the rain. The bones, in time, fell from one another, destined at the next overflowing of the lake or river's banks, to be borne away from the spot where the creature had breathed its last; the skull to one part, the ribs and backbone to another, the leg-bones somewhere else, and one of the thigh-bones down (as I said) to where they were all then standing. Here it became imbedded in the loose sand, to have gradually accumulating masses of earth, by the mechanical action of water, heaped upon it; to undergo the processes of pressure and petrifaction, together with the sand in which it became entombed; to repose there for the many thousands of years preceding the appearance of mankind upon the stage of the earth, as well as for an equally long period since, or until that very morning, when some men in Sussex,—viz., Jack Penfold, Bill Thompson, George Humphrey, and others, being employed in quarrying for building stone, succeeded in disinterring and bringing to light a part of the body of that huge animal which had lived and died more than a million of years before.

This concluded my brief geological address in the stone-pit to about a score of hard-working, hard-handed men. Whether their heads and hearts were as hard as the palms of those hands which were almost simultaneously extended towards me to clasp mine as I ceased to speak, I had good reasons for doubting. Stone bottles and small wooden kegs, as well as horn cups, were hoisted into view. "They wished," said they, "that the liquor was better tipple for my sake." Not, therefore, to offend the honest pride of either of them, I drank a little with each, and as I moved to take my departure, and they to return to their stone-quarrying, "Talk of a sarment," said Jack Penfold, "that's the sort of sarment for me! What do you say, Bill?"—"Ay! ay!" was the laconic answer.

As I ascended the deeply-rutted waggon-truck

road which led from the quarry, and as I looked down upon the scene I had just quitted, I was cheerfully hailed by my late "congregation" with these words, "Good afternoon, sir!" while hands were simultaneously raised to their foreheads or to lift up from those sweating brows the rough-worn caps which had covered them. Turning then, homeward-bound, into the nearest lane, I could not help pleasantly pondering, on my solitary way, upon what that morning had brought forward as tending to my own, as well as, I hoped, to the intellectual gratification of others.

MICROSCOPICAL RESEARCH.

IT is a singular fact, but it is not the less a true one, that there is no country in the world where excellent microscopes can be had cheaper, and yet where there is less good work done with them than England. A great deal may be said, doubtless, on the high value of the immersion lenses now so much employed on the Continent, and manufactured on so large a scale by Hartnack of Paris, and Merz of Munich. But if the immersion system prove, as it is likely to do, one calculated to meet the wants of the investigator, we shall be able to surpass the French and Germans, even in the manufacture of this form of objective. And, in so far as the ordinary dry lenses are concerned, we do not hesitate to affirm that there are no manufacturers, whether Continental or American, who can stand in competition in work of this kind with our English makers. There are, we know, a few who go into ecstasies over Nachet's "stands," but we have seen these instruments, and can honestly say that they have nothing in their favour but their great weight; and, for durability, solidity, and beauty of workmanship, we should not think for a moment of comparing them with the "stands" of our best London makers. Differences of opinion may exist on this as on all other points, and we shall be very glad to hear the views of our numerous correspondents on the subject. But we believe that the great bulk of those who have experience in the microscopes of different countries, will admit the force of the proposition with which we started, that English microscopes, taken *tout entier*, surpass those of every other nation.

How is it, then, we ask, that with such excellent appliances so little good work is done annually in England? Is it that the number of those who possess microscopes is so limited, or is it that the instrument is used "in a groove" by persons who have never been taught the wide field for exploration which lies before them, and who are ignorant of the methods of microscopical inquiry? The former question can, we think, at once be answered in the negative. A visit to any of the *soirées* of the Royal Microscopical Society or Quekett Club, or to the houses of our first-class opticians, will demonstrate in a very few moments the fact that the microscope is an instrument having an extensive sale, and that it is largely distributed among all classes, and is much used by those who purchase it. It cannot be then that the microscope is not in the hands of persons who are interested in testing its capacities, and therefore we are bound to fall back on the alternative explanation that the absence of important research—or rather of the due proportion of scientific investigation—is owing to the circumstance that the thousands of earnest and industrious people who possess good microscopes have never yet been taught in what direction to turn their labours.

Go where we will among microscopists, we unhappily find that the rage for perpetually poring over diatomaceæ is nearly universally epidemic. Men with the best instruments and most perfect and elaborate appliances for scientific inquiry, spend their hours in, we won't say fruitless, but certainly in unprofitable exertions to bring out the markings in an *angulatum* or a *rhomboides*, just as if the only thing to be done with so useful a means of research as the microscope undoubtedly is, was to discover how many lines on a minute vegetable structure could be brought into view. There was a time when such inquiries were useful, as they stimulated the manufacturer to bring his lenses up to that degree of optical perfection which entirely, or nearly so, avoided aberrations. But assuredly the present optical perfection of the microscope, so close as it is to theoretical possibilities, is all-sufficient for biologists, and it is melancholy to waste time in attempts of the kind, while so much important biological research awaits the ardent student. And, indeed, it is to be observed, *en parenthèse*, that the very optical imperfections which some *diatomaniacs* would seek to remove, are those most valuable in anatomical studies. Definition is an excellent quality, but it is not paramount; and for the worker the mean between the highest "definition" and the greatest "penetration" is what is required.

We make these remarks in the hope that some of our older workers with the microscope may be induced to come forward and give advice to the large field of amateur labourers who are now doing just that kind of useless work which is known to seamen as "scraping the cable." What we should like to see would be the delivery of a course of lectures "on the work to be done with the microscope," by some master in biological inquiry. If some one like Professor Huxley would come forward and give "a working man's lecture" on the multitude of important points to be made out by means of the microscope, we believe he would do more than has been achieved for years to advance histological research in these countries. The man who has a microscope wants to be led out of the manufacturer's groove of

"diatoms" into the field of physiology. He requires to be shown what an area for observation and thought would be opened to him in the study, say, of the embryology of even the simplest and commonest forms of life. Will no one take up this good office and discharge it faithfully and thoroughly?—*Scientific Opinion*, June 2, 1869.

COMMON HERBS.

"Of all the joys that fill the breast,
Joys of knowledge are the best,
Link'd to man's diviner part,
Oh they purify his heart."

WELL may Mr. James Britten remark in the July number of Science-Gossip that "there are a class of persons who neither know, nor care to know, anything about our wild plants;" and I am very sure the same observation might be made in reference to the lack of knowledge evinced regarding our common garden herbs.

I was forcibly struck with this fact the very day Science-Gossip reached me. I had been reading Mr. Britten's article on Cranesbills, when the lunch-bell sounded, and when I went down, I found a party of ladies discussing a sprig of Marjoram, the Sweet Marjoram of our gardens.

"It is a kind of mint; a foreign sort, it comes from Turkey," cried one.

"My gardener tells me it is Bergamot mint," said another.

"I see it in my garden, but I never have it used for culinary purposes," added a third; while a fourth ventured to suggest that it was Sweet Marjoram.

"What a singular name!"

"How absurd!"

"A nickname, not the real name of course," exclaimed all three voices, and a lady at the upper end of the room offered the information that "the word was met with in old books."

Spirit of Shenstone! ghost of "The Schoolmistress," I expected them to appear, and repeat these lines:—

"And Marjoram sweet, in shepherd's posy found,
And Lavender, whose spikes of azure bloom,
Shall be erewhile in arid bundles bound,
To lurk amidst the labours of her loom,
And crown her kerchiefs clean with mickle, rare perfume."

But as neither good old dame in "russet stole" nor poet came to do my bidding, I sat me down to write a gossip which should introduce a few of our garden herbs to the readers of Science-Gossip at any rate, provided the kind editor accords me space. So to begin with—

Origanum Majorana (Sweet Marjoram). It belongs to the same class, order, and natural order as Mint certainly, but, correctly speaking, no one would call it "a mint." It possesses similar properties to the wild Marjoram, but it is specifically distinguished from it by its *roundish*, thin, compact spikes, and the form of the leaves, which are more elliptical.

The scent of leaves and flower-tops resembles that of the wild Thyme, a perfume I think very agreeable; the flavour also is, in my opinion, pleasant; but I know many persons object to its use in cookery. Foreigners, however, in this country at least, patronize it, French cooks particularly: they use the dried leaves in soups, omelets, and stuffings very extensively, and I have known the Welsh peasantry make a far from bad substitute for tea of a strong decoction of "*Margery*" leaves, as they call the herb. Its qualities are tonic and stimulant. It is greatly lauded in country domestic medicine as a remedy in all spasmodic affections. Little children suffering from whooping cough are dosed with it, old women afflicted with asthma swear by it, and I really do believe its virtues are rather powerful, only our medical men do not recognize them, seeing the herb is a common one.

The genuine name is derived from "joy," and a very appropriate one it is, for the sweet aromatic odour and pretty appearance of the plants render them very welcome in hilly places, which in a wild state they most affect.

Marjoram comes from the Arabic. The Arabs who use this plant call it "Mary amych," the Swedish *Dosta*, the German *Dosten Kraut*. In Sweden the wild *Dosta* is applied to a variety of purposes. The flowering tops form a very good purple dye for linen articles, but it tinges wool with a reddish-brown hue. Should any reader feel disposed to experimentalize, if purple be the colour desired, the linen must first be steeped in alum-water, and then lie for eight-and-forty hours in a decoction made from the bark of the Crab-tree (wild apple), before it is immersed in Marjoram water.

Publicans (it is said) often use both the wild and sweet Marjoram. The dried plant will, if put in a cask of ale, correct acidity, or if put in when the beer has nearly finished fermenting, it renders it powerfully intoxicating; this last quality seems slightly puzzling, as the plant is not a narcotic; but I suppose its excitant properties come into play here. The Dittany of Crete is a foreign species of Marjoram like the Sweet Marjoram, but some writers are of opinion that the *Cunila bubula*, mentioned by Pliny, was our *Origanum vulgare*, as it grows in all calcareous soils throughout Europe. Its pretty spikes of flowers are in full beauty now (July), and will continue to show bloom until August. An infusion made with half an ounce of the dried flower-heads and leaves in a pint of boiling water, is a safe remedy in nervous headaches, whilst the oil of Marjoram placed in a hollow tooth eases that most horrible pain, the toothache; but I forget, the readers of Science-Gossip chiefly belong to the sex who are, happily for themselves, most exempt from those ills which flesh, especially female flesh, is heir to, in the shape of nervous diseases.

Helen E. Watney.

THE KESTREL

(*Falco tinnunculus*).

WHEN falconry was at its zenith in England, and men of every rank, from king to peasant, had each a particular species of hawk according to his rank, the commonest of all was assigned to the peasant or serving man—*coistrel*—as he was called, perhaps from the Latin *coterellus*. From this circumstance it is probable that our modern Kestrel derived his name. We find the word variously spelled by different authors. Shakespeare has *coystril* ("Twelfth Night," act I., sc. 3), and *coistrel* ("Pericles," act IV., sc. 6). Blome in his "Gentleman's Recreation," 1686, writes it *castrell;* while as early as 1614 we find it as *kesterel.* *

What a change has taken place since the last-mentioned date with regard to hawks in England! Formerly the Kestrel was as much protected by law as the Pheasant is nowadays. In Domesday Book a hawk's "eyrie," or nest (*aira accipitris*), is returned amongst the most valuable articles of property. In the "Carta de Forresta," which King John was compelled to sign, privilege was given to every free man to keep eyries of hawks, falcons, and herons, in his woods. Edward III., who was wonderfully fond of hawking, passed some very stringent laws for the preservation of hawks. One of these statutes, passed in the thirty-seventh year of his reign, made it a felony to steal a hawk, and not only had the offender to pay the value of the bird by way of fine, but he suffered imprisonment for a term, according to the circumstances of the case. Later on it was considered so important to preserve these birds in England and give them every facility for rearing their young, that Henry VII. decreed that any person convicted of taking the nest or eggs of a falcon, goshawk, lanner, or swan, should be imprisoned for a year and a day, and fined at the king's pleasure; half the fine to go to the crown, and the other half to the owner of the ground on which the nest was taken. Even on his own land a man was not permitted to infringe this law, but was compelled to import from abroad what hawks he required for sport. When, however, the musket was introduced into England, and people learnt the art of shooting birds on the wing, the practice of hawking declined, and with it the necessity for the stringent laws just mentioned. Accordingly Elizabeth modified, and in a great measure repealed these statutes, which more recent legislation has entirely swept away. When we compare the Kestrel of old, strictly preserved, reared, petted, and tamed to take larks and blackbirds, with the bird of the present day, which is persecuted on all sides, shot and trapped as "vermin," and either nailed against a barn or miserably stuffed by a village barber, we cannot but regret the change which has taken place and the want of wisdom which has caused it.

There are few prettier sights in nature than the manœuvres of a kestrel on the wing. We never see its wonderful, almost motionless hovering, without thinking of the Ettrick shepherd, who sang of the Merlin:

> "And the Merlin hung in the middle air,
> With its little wings outspread,
> As if let down from the heavens there
> By a viewless silken thread."

From this peculiarity in its flight, as well as from its brown colour and more pointed wings, the Kestrel may be distinguished on the wing from the rounder-winged and grey Sparrow-hawk. We have often been surprised at the ignorance displayed by keepers on the subject of hawks. Many of them not only do not know a kestrel from a sparrow-hawk, but they actually admit that, although they have shot hundreds, they have never proved by dissection that their surmises with regard to its food were well founded.

Venturing to remonstrate once with a keeper who had just shot a kestrel, and would persist in calling it a "Sparrer-'awk," he said, "Lor' bless you, sir, I've shot scores on 'em. I know he [pointing to the bird] as well as I know this here dawg, and there ain't a greater varmint out. I'll be bound he's had some o' my young birds." We held a *post-mortem*, and instead of a young pheasant, we found he had been dining off a short-tailed field-mouse, with grasshoppers for second course, and the keeper was obliged to admit that he could not grudge him *that* fare. We begged hard for the poor Kestrel, but it is difficult to overcome a prejudice, and keepers have always a ready excuse, though oftentimes a poor one, for what they do.

A gentleman in Sussex once found a nightjar strung up with a lot of stoats and jays in his keeper's "museum." He immediately reproved the man for killing it. The keeper declared it was "a specie of 'awk;" but his master pointing to the bill and feet, clearly showed him that it was no such thing, and concluded by saying that for the future he wished such birds preserved. One would have thought that this would have silenced the man. Determined, however, to find an excuse, he said, scratching his head, "Well, sir, it's a narsty floppin' thing!"

But to return to the Kestrel. We have often been asked how it is that Kestrels appear to be so much more numerous in autumn than at any other time of year. There are many ways of accounting for this. Generally speaking, the observers are sportsmen, who cross the country more frequently in the fall of the year, and therefore notice the birds oftener. Then, again, by the time that young par-

* "A Jewel for Gentrie." London, 1614.

tridges are ready to fly, Kestrels are strong on the wing, and for every pair seen in spring, were it not for traps and guns, we may expect to find six or seven birds in autumn, for this species usually lays five eggs. But perhaps the best reason is that the Kestrel is migratory in its habits. The old birds move northwards in spring, and return southwards in autumn, when their numbers are reinforced by the young which have been hatched in the meantime; so that we see not only those which have spent the summer in our own neighbourhood, but numbers which have come from a distance, and which are passing onwards, hunting for food by the way.

It is worthy of remark that at the season when Kestrels are most numerous, the hay is stacked and the corn carried. Consequently, the long-tailed field-mouse (*Mus sylvaticus*) and the common meadow-mouse (*Arvicola agrestis*) are deprived of the friendly cover which has sheltered them throughout the summer, and are more easily espied by the Kestrels, who destroy them in numbers, and thus help to save our crops for the coming year.

In this good work they are joined by the Owls, particularly the Barn-owl (*Strix flammea*); and if there were no other reason for preserving these birds, this alone, one would think, should suffice.

The adult male Kestrel is characterized by his slaty-blue head and tail, and more intensely rufous back. The female is more sombre in appearance and more spotted, and never assumes the slaty-blue colour above referred to. They pair early in the year, and generally take possession of an old crow's nest, which they repair and sometimes re-line.



Fig. 131. The Kestrel, male and female.

The eggs, usually five in number, vary from a light brick-red or sandy colour to a dark chestnut. This colour is distributed over the surface in small spots or blotches, sometimes so thickly as to obscure the originally white ground-colour of the egg. We have occasionally seen eggs of this species blotched with chestnut at the larger end only, the remainder being pure white, and resembling in this respect eggs of the Sparrow-hawk. They had not, however, that bluish or greenish cast on the inside of the shell which is always apparent on holding an egg of the Sparrow-hawk up to the light.

Instances are on record of Kestrels nesting in a hollow tree after the fashion of Owls, and we have sometimes found them building, like the Peregrine, on the ledge of a cliff facing the sea. Notwithstanding that the Kestrel was formerly trained and employed for hawking, it is a troublesome bird to tame. We have kept several; but beyond coming to take food from the hand, when called, they never displayed that docility which the larger Falcons attain. Falconers nowadays (how few, alas! there are!) seldom bestow their time and trouble in training Kestrels, for the result scarcely repays them. The Peregrine, Goshawk, and Gerfalcon are more readily trained, and from their greater size and strength show better sport in striking larger quarry. Nevertheless the Kestrel is a useful bird, and we should like nothing better than to see a "close time" appointed for our land-birds as well as sea-birds,* when the Kestrel would have immunity from traps and guns.

J. E. Harting.

TRANSATLANTIC JOURNALS.

By this title we mean journals devoted wholly to Natural History; for of late several of these have made their appearance in the United States and Canada, with such a general character of excellence that we cannot longer refrain from bidding them welcome.

First and foremost, in point of time, as well as in its special claims upon our notice, is the *American Naturalist*, published by the Peabody Academy of Science, Salem, Mass.

This journal commenced upwards of two years ago, under very able editorship, and has maintained to the present a most excellent position. It is published monthly in octavo, magazine form, at four dollars a year. Each part contains fifty-six pages of good printing and paper, and is well illustrated. The wide range of subjects, their sound, but clear and popular treatment, and general interest, are features which will commend this journal to our readers. Let us take for example the last number (June, 1869); it contains "Bitterns," by W. E. Endicott, with an illustration; "The Mule Deer," by W. J. Hays, with a page plate; "The Naturalist in California," by Dr. J. G. Cooper; "Hints on Taxidermy," by C. A. Walker; "A Fish Farm," by E. Dexter, with illustrations; "The Fresh-water Aquarium," by C. B. Brigham; "Reviews;" "Natural History Miscellany," including "Zoology," "Botany," and "Microscopy;" "Proceedings of Scientific Societies," and "Answers to Correspondents."

* An Act for the preservation of sea-birds was passed on the 24th of June last. It is now illegal to shoot them between the 1st April and the 1st August.

More recently the *American Entomologist* has started: it is published monthly by Messrs. R. P. Studley & Co., of St. Louis, Mo., and contains twenty pages of a uniform size with our own journal, at one dollar per annum. The 10th number (June, 1869) contains an article on "Imitative Butterflies," with illustrations; "The Chinch Bug," also illustrated; "Cabbage Worms;" "Wasps and their Habits;" "The Social Wasps;" "Mounding Peach-trees;" several other short papers, and numerous notes and queries. This journal is edited by two good Entomologists, and combines much that is popular with sound science. We heartily wish it continued success, for that is no more than it deserves.

The American Bee Journal is published monthly at Washington, and has been four years in existence. We have only seen one or two numbers.

The Canadian Entomologist, commenced in August, 1868, under the auspices of the Entomological Society of Canada, and is only an octavo of eight pages, monthly, at fifty cents per annum. This cannot be called a popular journal, being rather a record of captures, and notes for Canadian collectors; as such it is doubtless useful to residents, though scarcely of interest here.

Le Naturaliste Canadien is a journal in French of 24 pages, octavo, at two dollars a year, and is published at Quebec. There are a few illustrations in the five parts already issued, but these are of a very inferior character; the price is high, and the matter —nothing in particular.

The Canadian Naturalist and Geologist, published by Dawson Brothers, of Montreal, has reached the fourth number of its third volume; but its appearance is so very erratic and uncertain, that it suffers in consequence, and we are doubtful whether it should not be regarded as an "annual" rather than a "monthly" or "quarterly." This is much to be regretted, since some excellent papers have been published in it, although of late almost exclusively geological or paleontological. Surely the Microscopical Section could render some aid, for there exists already a Microscopical Society at Montreal, although it seldom makes itself known.

Having now gone over all the "Transatlantic Journals" to be found on our table—except the *Dental Review*, which has microscopical papers in fair proportion, — we must congratulate our "cousins" on what they have done already, since the war, in Natural History Journals and Microscopical Societies, and wish them continued success, even if they do borrow a notion or two, now and then, from the old country.

Neilgherry Sundew (*Drosera peltata*, Sm.).—Major Drury says of this plant, in his "Useful Plants of India," that "the viscous leaves close upon flies and other insects which happen to light upon them."

A REMARKABLE TRIO.

IT is rather singular that three trees, so widely separated in their properties as the Breadfruit, the Cow, and the Upas, should nevertheless be nearly related, and all members of one and the same family, the *Artocarpeæ* of R. Brown. The first-named, the Breadfruit (*Artocarpus*), which, in fact, gives its name to the order, is common in the islands of the Southern Ocean, and is cultivated in many parts of the tropical world. Indeed, it was when Captain Bligh was on a voyage to introduce the *Artocarpus incisa* into our West Indian possessions, that the famous "Mutiny of the *Bounty*" occurred in the year 1787. The attempt was more successful in 1793. The great value of the tree consists in its fruit, which constitutes an important article of food. When nearly ripe, it weighs three or four pounds, and is as large as the head of a young child; is of a greenish colour, and enclosed in a thick rind. The soft, tender interior can easily be divided or sliced, and forms an excellent dish when cooked, having the appearance of new bread, with something of the flavour of the artichoke. In many of the Pacific islands it affords the principal means of support to the natives through a large part of the year. Another species, the Jack (*A. integrifolia*), has a much larger and longer fruit, of a pear shape, eighteen inches in length, and often weighing thirty or forty pounds. It is utilized in the same way as the true Breadfruit, but is not considered so great a delicacy. The Cow-tree (*Galactodendron*) is of benefit to mankind in a totally different manner. One of the peculiarities of the *Artocarpus* family is the presence in the stem, leaves, fruit, &c., of a milk-like juice, which is usually of a poisonous nature; but even if innocuous, is not generally produced in sufficient quantities to make it of any service. In the Cow-tree, however, this fluid is not only without injurious properties, but exists so abundantly, that when an incision is made in the trunk, a copious stream issues forth, in no respect inferior to the milk proceeding from the cow. Humboldt, who was the first to publish a notice of the *Galactodendron*, says: "For many weeks we had heard a great deal of a tree, whose juice is a nourishing milk; an assertion which startled us the more, as almost all lactescent vegetable fluids are acrid, bitter, and more or less poisonous. Experience, however, proved to us, during our residence at Barbula, that the virtues of the Cow-tree, or *Palo de Vaca*, have not been exaggerated. It was offered to us in calabashes, and, though we drank large quantities of it, both at night before going to bed and again early the following morning, we experienced no uncomfortable effects. The viscidity of this milk alone renders it rather unpleasant to those who are unaccustomed to it. The negroes and free people, who work in the plantations, use it by soaking in it bread made from maize, manioc, aropa, and cassava." This marvellous tree appears to be confined to the mountain-ranges on the northern coast of Venezuela, where it is found at a height of 1,000 or 1,200 feet above the sea-level. Its trunk frequently has a circumference of eight feet, with a white close-grained wood, not unlike that of the Box. The third member of this remarkable trio is as noted for its evil qualities as its relatives are for their useful properties: I allude to the "deadly Upas-tree" of Java (*Antiaris toxicaria*). Were we bound to believe all the stories which travellers have reported of it, we should see before us a sort of vegetable monster without an equal in its death-dealing powers. A fountain of pure prussic acid, or a permanent column of unadulterated carbonic acid, would be mild and wholesome compared with the exhalations which are said to proceed from the Upas! Standing alone in a desert of its own making, no plants can raise their heads where its shadow falls, no animal can approach within half a mile of its fatal vapours; the very birds are stricken to the earth by the subtle poison which rises from its broad summit into mid air. Even to come near the tree, for the purpose of extracting the poisonous juice from its stem, was a work of so much danger as to be performed only by the worst of criminals. Fortunately for the world, all these tales are pure fiction, without a shadow of truth. It lives in the midst of dense forests; birds perch on its ample boughs, and wild animals prowl under them with impunity. The truth seems to be that the low grounds in Java, hot and humid, are rank with malaria, and occasionally productive of carbonic acid in large quantities, like the Grotto del Cane near Naples; and consequently very prejudicial to human life. For some inscrutable reason, the Upas has to bear the blame, which is really due to totally different causes. The only certainty in "this strange eventful history" is that the Upas, on being wounded, gives out a thick milky fluid, which, unlike that of its relative the *Palo de Vaca*, is to the last degree poisonous, and under the name of *Antjar*, is employed by the natives on their arrow and spear-heads with terrible effect.

W. W. Spicer.

DR. THUDICHUM'S RABBIT.

POOR brute! could it speak, what a long doleful story would it tell of cutting and maiming, and divers other species of torment, and what a reply would it make to the complaint of our aristocratic landlords at its innocent depredations! Dr. Thudichum's rabbit is dead. It's no use putting the Roman capitals at the termination thereof; had the quadruped been decently and quietly buried, we might have added R.I.P. to its

epitaph; but it *doesn't* "rest in peace," for, worried to death during its lifetime, it is cut up into delicate bits, and exposed to the gaze of the curious afterwards. Yes, Dr. Thudichum's "illustration" is no more: after surviving three years' torment before the savans of our institutions, it died, poor thing, from the effects of a slight cold. Of all the terribly humilating diseases to which mankind is heir, perhaps that of Trichini is among the very worst: to be literally eaten up, like Herod, of worms! and such marvellously little worms too. There may be some satisfaction in being swallowed by a boa, but fancy being despatched by creatures whose individual length is the $\frac{1}{1166}$ hundred thousandth of a line. Well, the disease must be understood, and its diagnosis chronicled; so, as human beings—some of them at least—are of more value than many rabbits, some other vertebrate must be selected, and in the learned doctor's case it was a rabbit. A small piece of a dead man recently killed by this class of Entozoa, was forced down the rabbit's mouth, and as soon as the flesh was dissolved, the cysts in which the worms abode were set free, and breeding began, and very soon after, from various parts of the animal's body, small parts of its muscles were snipped up with the forceps, in which plenty of the re-encysted worms were discovered. Three or four times the rabbit was re-Trichinized, each time "successfully;" but the otherwise happy condition of the animal's life, and its good health, protracted its latter end for about three years, and then, as I have said, it died of a cold, and falling into skilful hands, it was taken to pieces and injected, and in all parts of its muscles a large colony of Trichini were exposed comfortably coiled up in their chalk cottages between the ultimate fibre of the voluntary muscles. In a preparation from the biceps muscle of a child four and a half years old, who died on the 79th day after the discovery of the disease, fifty-eight thousand Trichini were computed in the fifth part of a grain, while in the entire muscles of a man, weighing 40 pounds, so many as twenty-eight millions have been reckoned, whose united length would be equal to the incredible number of ninety English miles, causing the entire disintegration of the muscular fibre, and destroying the mechanical action of the heart. Not very pleasant, is it? But don't be alarmed; it very rarely happens that fatal cases happen, except it be from eating raw or inferior and badly-cooked meat; and even then it is with some persons long before the end comes. In Dr. Thudichum's specimens prepared by Mr. Norman, of 178, City Road, the cysts are very freely distributed in the fibre of the muscle of the tongue. In a beautifully injected specimen I purchased there, I discovered in the length of one-third of an inch about fifty, and very strikingly have they built up their houses between the walls of the striped fibre. The voluntary muscles appear to be the Trichini hunting-grounds, and so many as 1,000 have been observed to be produced by one female every two or three weeks; but sometimes they got the worst of it, and then they are buried alive in their own coffins. Professor Owen first mentioned the disease in 1835, and the recent experiments made by Dr. Thudichum with his rabbit have gone very far to discover its natural history and the method of its cure, though the best "prevention" is to be found in *not* eating raw ham, and *eschewing* half-cooked pork; but, for the curious, an examination of the roads travelled by Trichini along the happy land of Doctor Thudichum's rabbit's tongue, or any other part of its body, is employment for the microscope of a very interesting kind; for, at the same time, so skilfully are the injections prepared, that the capillaries of the papillæ are seen with the quarter objective very distinctly, while the striped fibre of the voluntary, and the simple fibre of the involuntary muscles, are everywhere studded with encysted Trichini, besides a great deal of other interesting matter.

J. Crowther.

FRAGILLARIA CROTONENSIS.

I AM obliged to Mr. Roper for reminding me of an omission in my paper on the Croton-water forms of diatomaceæ. I ought to have mentioned *Fragillaria crotonensis* was *F. capucina*, var. γ of the Synopsis. I am not prepared, however, to admit that this species is only a variety of *F. capucina*. Professor Smith describes his var. γ from the Rosthorn Mere gathering, and he is right in saying imperfectly silicious; but I do not think this has anything to do with the non-attachment of the frustules excepting at the centre; in other words, the central inflation is the normal state of the frustule. The Croton-water species is firmly silicious, and the inflations as distinct in the wet frustule as when dried and burnt on the slide. My lamented friend Dr. Arnott, to whom I am indebted for the Rosthorn Mere slide, and a suite of specimens of *Fragillaria* (57), says in his letter, "I send you the droll form of *F. capucina* γ, Smith;" and I find in his reply to my acknowledgment of the slides this remark: "I think we had better refer this form to *F. capucina* until we find vigorous specimens." This, I think, has been done in the "Croton-water sediment." Further correspondence was prevented by the illness and death of my valued friend.

I have greater doubts of the genus than the species of this form, and if the filamentous arrangement of the frustule is ignored, I see nothing to distinguish it from *Synedra*, and Professor Smith has done so in his *Synedra fontinalis*, and which is identical with the *Fragillaria tenuicollis* of Heiberg.

It has been suggested that *F. capucina*, *Synedra fasciculata*, *S. minutissima*, and *S. pulchella* are all one species.

F. Kitton.

ZOOLOGY.

Abyssinian Birds.—At the last meeting of the Zoological Society a communication was read from Dr. O. Finsch on the collection of birds from North-eastern Abyssinia and the Bogos country formed by Mr. William Jesse, zoologist to the Abyssinian expedition. The collection was stated to be of great interest, and to contain seven hundred and thirty-five specimens referable to two hundred and twenty-one species, whereof two appeared to be new to science.

Salmon in Maine.—The finest of salmon are now being taken from the waters of the Penobscot. About three miles above Bangor they are taken in drift nets. But below, near Searsport and Bucksport, they are taken in large quantities in weirs. The number appears to be on the increase yearly, and the business of taking them is highly remunerative. They weigh generally twelve pounds apiece and upward, perhaps twenty-four pounds. One was taken at Belfast the other day whose weight was twenty-seven pounds and a half. The present price is about forty cents a pound.—*Chicago Times*, May 30.

Otter.—I copy the following from the Abingdon News of the *Oxford Chronicle* of to-day (July 3rd):—"On Sunday last a very large otter was caught in the basket rings in a pool just below Mr. Blake's. It weighed about a ¼ cwt."—*H. Ward.*

The Crane in Norfolk.—In addition to the Crane recorded in Science-Gossip for July, p. 160, as having been killed at East Summerton on the 7th of May, one has been shot on the marshes at Thornham, which is now in the Lynn Museum, and another killed at Pickenham, near Swaffham. In the *Field* of the 12th of June, four are said to have been seen at Burnham, two of which were killed. I regret to say there is a probability of the Ruddy Sheldrake, recorded by me at the same time, being an escaped bird, one having been lost by a gentleman some miles from Snettisham a few days before. I examined the bird in question myself soon after it had been set up; it was a male in fine plumage, and presented not the slightest appearance of ever having been in confinement. The escaped bird was purchased with a female, which died before the male escaped, in Leadenhall market, and is said to have been received from Russia.—*J. Southwell, Norwich*, July 3rd, 1869.

The Otter in Sussex.—I copied the following this morning from the *Brighton Herald*:—"*Capture of another Otter in Sussex.*—Two or three of these destructive animals have recently been captured in this county. As one had for some time past been seen in the neighbourhood of Barcombe, a reward of two pounds was offered for his apprehension—dead or alive—and this led to energetic measures. He was seen on Saturday, and some men employed at the oil-mills set a trap for him. On Sunday morning on going to look at the clams, they found him caught by one of his hind legs. Prongs, &c., were soon brought into requisition, and the animal killed. He turned out to be a fine animal, weighing 13¾ lbs., and a handsome subject for stuffing."—*T. W. Wonfor, Brighton*, July 3rd.

Wren and Fly-catcher.—This morning I saw a strange example of socialism at Swaysland the naturalist's. A wren had nearly finished its nest in an elm-tree, when a fly-catcher commenced building; and the two birds had evidently finished their nests in company, for while the wren's nest, mainly composed of shavings, leaves, &c., was perfect, the fly-catcher's was not simply built on, but into the wren's, of moss and horse-hair. When brought in the night before from Preston, the wren's had three eggs and the fly-catcher's four. I fancy, from the fact of the former having been built against the elm, some of its eggs had been dropped when the nest was taken, for the back of the nest was quite open at one point. I saw also a curious illustration of how soon birds will build and lay near the same spot after their nest has been taken. A couple of redpoles built a nest in a garden near Montpelier Crescent in a willow tree, and when five eggs had been laid the nest was taken; nine days after the same birds had built in an adjoining elder another nest, and the female had laid five eggs. In the latter case the nest was mainly composed of cotton from the willow. Both trees were quite close to a public path.—*T. W. Wonfor, Brighton*, July 3rd, 1869.

Dartford Warbler's Nest.—The much denied fact, viz., a Dartford Warbler laying five eggs in one nest, has been proved by Swaysland and his wife, who have spent weeks this year in watching on the downs the habits of this bird. Since April they have found seventeen nests, one containing three eggs only, one on June 25th five, and the rest four each. I saw to day thirteen nests in one box, among them the prize; and while there was great variety in the general appearance and markings when compared nest with nest, yet the eggs in each were alike.—*T. W. Wonfor, Brighton*, July 3rd, 1869.

A Hawk's Home.—Mr. L.'s gamekeeper, in Wiltshire, recently shot a hen hawk. He found her nest with four young ones in it, all dead for want of the hen's care. But the male bird continued to bring food to the nest, and between Friday and Monday brought eighty-three birds, chiefly blackbirds and thrushes, also one mouse, and a pheasant's egg. My friend adds, where

keepers shoot all hawks, as here, no wonder one's fruit is all eaten by swarms of blackbirds and thrushes. They take our strawberries, through the netting, while green.—*R.*

The Deep-Sea Dredging Expedition.—H.M.S. *Porcupine* arrived here on the 12th inst., after a most successful cruise from Killybegs, our last station. Dredgings have been carried on during the past fortnight outside the Rockall Fishing Bank, at the following great depths:—1,215, 1,263, 1,360, 1,366, 1,380, 1,443, and 1,476 fathoms. This places the dredging achieved by the officers and crew at the head of all such enterprises, the Portuguese having dredged 300 fathoms, Norwegians 450, Americans 517, and H.M.S. *Lightning* (last year) 650. The rope is drawn up with the aid of the donkey-engine at the rate of 100 fathoms every five minutes. Two cwt. of material has on several occasions been taken from the bottom, which is a clayey foraminiferous mud, consisting almost entirely of Globigerinæ, Orbulinæ, &c., sponges and other minute organisms; small crustaceans and annelides of brilliant scarlet, and other colours, were found, besides echinoderms, mostly naked. The mollusca are for the most part bivalves, and nearly all new to Britain, and of a northern type in general, consisting of Ledæ, Nuculæ, and Solenellæ, and the fry of Isocardia, Cora, Dentaliæ, &c. Mr. Gwyn Jeffreys is now relieved by Prof. Wyville Thomson, of this town, and it is proposed to get dredgings in still deeper water.—*B. Sturges Dodd, Belfast.*

A Poor Prisoner.—While taking a walk along the banks here on Sunday afternoon (July 11th) I heard an unusual chirping among the small birds in the vicinity of a clump of whins, and on going up to the place where they were, I was surprised to find a bird entangled in its own nest; and the sight which presented itself to me was one which I, or I dare say any other person, never saw before. The nest was that of a hedge-sparrow, which had long since flown, but one poor captive had been left. The claws of one of its feet had got so entangled among a portion of the wool with which the nest had been lined, that its escape was impossible. In its endeavours to get free it had broken one of its legs at the thigh, just a little above the joint, and was hanging by a small portion of flesh. I released the poor sufferer, and amputated the broken leg; then set it at liberty. It must have been in that position for a long time, as the nest was literally filled to overflowing with its excrement: it must have been fed by its parents all the time of its captivity.—*A. M. F., East Neuk o'Fife.*

It may be of some interest to the readers of Science-Gossip to know of the capture of a very curious white variety of the Little Blue (*Polyommatus alsus*) in this neighbourhood by a friend of mine. I saw the insect a little time after its capture. The whole upper surface of the wings was of a creamy white, the under of the same colour, but with the eyelike spots peculiar to the "Blues" generally.—*W. A. Forbes, Winchester.*

A Sword-Fish taken off Newhaven.—On the night of Saturday, June 26th, some Eastbourne fishermen captured in a net, off Newhaven, a sword-fish about ten feet long.—*T. W. Wonfor.*

The Cuckoo seems this year to have departed from his usual custom of changing his tune in the month of June. I heard his well-known cry in Buckinghamshire on the 25th of June, and in Surrey on the 6th of July.—*W. R. Tate, 4, Grove Place, Denmark Hill.*

Moths in a Candle.—The Japanese say that all other night-flies, moths, &c., fall in love with one particular night-fly, which is exceedingly beautiful, who, to get rid of their importunities, maliciously bids them, under the pretence of trying their constancy, to go and bring to her fire. And the blind lovers, scrupling not to obey her command, fly to the nearest fire or candle, in which they never fail to burn themselves to death.—*Pinkerton's Voyages.*

Fleas.—We read in "Purchas's Pilgrims" that the Jews were not permitted to burn fleas in the flame of their lamps on Sabbath evenings.

Spider Silk.—De Azara states that in Paraguay a spider forms a spherical cocoon for its eggs, an inch in diameter, of a yellow silk, which the inhabitants spin on account of the permanency of the colour. The ladies of Bermuda make use of the silk of the silk spider (*Epeira clavipes*) for sewing purposes.

A Chrysalis Flying.—Happening to be in my garden about the middle of June, I took to watching some butterflies flying among the cabbages. My attention was attracted to one by having as it seemed to me something strange on its back; I thought at first sight that it was being attacked by some ferocious insect; but on capturing it, which I succeeded in doing without difficulty, as its flight was a little heavy, I was not a little surprised to find that the poor cabbage-butterfly (*Pieris Rapæ*) was encased in its own chrysalis, its thorax and wings being out and its body within the chrysalis. I tried to extricate it from its peculiar position, but I found that its body was so completely fixed inside the chrysalis, that I could not get it out without injuring the butterfly. I killed it just as it was, and pinned it out; so it just looks like a chrysalis with wings.—*A. M. F., East Neuk o'Fife.*

BOTANY.

Abnormal Fruit of the Sloe.—On the 22nd ult. I received a note from Mr. T. Southwell, of Norwich, enclosing a curiously malformed specimen of the Sloe, and asking my opinion as to the cause of its singular malformation, whether caused by insects or otherwise. The results of my examination were thus stated in a note to Mr. S. :—"In one only of the abnormal drupes did I find any trace of insect life, and in that case I could not in any way attribute the change of form to its agency. It appears to me we must look to some other source than the insect world for the cause of this strange malformation. I noticed that in every case of abnormal growth the epicarp and sarcocarp were fully developed, though apparently diseased, while the endocarp on the contrary, with its contained seed, was represented by a mere speck of brown, withered, membranous tissue. In one abnormal drupe, larger and rounder than the rest, the endocarp was somewhat more fully developed and was evidently still growing." On the 2nd inst. I received another letter from Mr. Southwell (which I quote with his permission), in which he informed me that a friend of his had sent a specimen to Kew for Dr. Hooker. He is from home, but the keeper of the herbarium, Mr. Oliver, replied. He believed the malformation was due to a fungus, and that Mr. Berkeley had sent a note on the subject to the *Gardener's Chronicle*. The specimen sent he would not pull to pieces, but preserve for the Kew museum. By the next post he wrote to say Mr. Berkeley's note was to be found in the *Gardener's Chronicle* of June the 19th; upon referring to which I found a letter signed Armagh, describing the bladder plums which the plum-trees in that neighbourhood were producing, and in the Scientific Committee's report of the Royal Society the following note :—"Dr. Thomson exhibited specimens of bladder plums from a hedge in Northamptonshire. The fruit here presents none of its ordinary succulent characters; the stone is not formed, and the ovule is more or less atrophied. Sometimes a second carpel is produced. The phenomenon in question is due to a parasitic fungus (*Ascomyces deformans*)." In India a particular form of bird cherry is pretty constantly affected in this way, and the plant has in consequence received the name of *Cerasus cornuta*. It thus appears that this singular malformation is the result of fungoid growth upon it, and that the same malformation occurs in other nearly allied stone fruits. Perhaps the readers of Science-Gossip can give further information on this interesting subject, as to its distribution and former appearances in this country, and as to the influences which favour its production.—*John Hepworth, St. Mary's Vale, Chatham.*

Abnormal Wallflower.—"H. O. S." sends flowers of the singular malformation of the Wallflower, called by De Candolle the variety *Gynantherus*. In truth what under ordinary circumstances are stamens, are here represented by carpels; so that there is a double set of ovaries, the normal one encircled by an adventitious one, consisting of the transformed stamens. The petals at the same time are smaller than usual. See Masters' "Vegetable Teratology," p. 305, where a description and figures of this change are given.

The Shamrock (pp. 66, 91, 138, 162, 166, 167).—Mrs. Watney will find the arguments in favour of the *Oxalis Acetosella* being the true Shamrock, in my paper on "The Woodsorrel" in Science-Gossip for 1868, p. 53. The question is one which will probably never be settled, as far as the plant used by St. Patrick is concerned; but it seems evident that, at the present day, *Trifolium minus* is the chosen Shamrock. In addition to the counties named by Mrs. Brenan, I may mention Carlow, Limerick, and Kerry, in which this plant is pointed out as the national emblem. In *Cybele Hibernica*, Edward Lhwyd is quoted as writing in 1699, "Their Shamrug is our common clover," and in the same work, "Threlkeld, the earliest writer on the wild plants of Ireland," is referred to as stating that *T. repens* "is the plant worn by the people in their hats on St. Patrick's day." The purple-spotted *T. repens* is, I fancy, only looked on as the real Shamrock by those who have not troubled to think about the probability (or improbability) of a cultivated variation unknown in a wild state (?), having been found in the time of St. Patrick, but having since disappeared. —*James Britten.*

Habenaria chlorantha (bifolia), p. 162.—I have gathered specimens this June, with the pollen-masses in the position of those referred to by "M. C.," but my conclusion as to how they came there was different from his, although I am by no means sure that I am right. My impression is that the pollen-clubs, with the disc to which they are fixed, are, as usual, pulled forcibly from their original position by the moth which is the instrument by means of which the flowers are fertilized; that in going from blossom to blossom of the long spike—and the spikes of my examples were remarkably fine—before the viscid matter on the disc has had time to solidify, the pollen-masses are brushed off, or become otherwise detached, and falling on the projecting lip or other part of the blossom, adhere so firmly by means of this natural cement, that they appear to have grown there. Perhaps some reader who has made a specialty of Orchids will come forward and correct me, if wrong, or confirm me, if right. Not having made a study of the Orchids, my suggestion is made rather in the hope of eliciting additional information than in the idea that it is correct.—*James Britten.*

MICROSCOPY.

Maxime Miranda in Minimis.—Under this motto Mr. H. C. Richter has just published a photograph of a group of microscopic animals and plants collected from a pond at Leytonstone. It contains thirty-five objects, including rotifers, infusoria, entomostraca, water-bears, diatoms, desmids, and conferva. The whole is an exceedingly artistic group, and it could not well be otherwise, since it is the result of a labour of love by one so well known as an artist in the department of Natural History. Each object is in itself a study, and we venture to think that the group of water-bears is the most natural, and perhaps the only natural delineation of these singular creatures we have ever seen. The photographs are neatly mounted on stiff cardboard, and may be had at a very reasonable price, either of Mr. T. Ross, Messrs. Beck, or Mr. C. Baker, the well-known opticians.

Diatoms of Northumberland.—In the last part of the *Quarterly Journal of Microscopical Science*, Dr. Donkin furnishes a paper on several new (?) and rare species of freshwater diatoms discovered in Northumberland. The learned doctor in the pursuit of his investigations, with the view of publishing at no distant period an entirely new work on the British Diatomaceæ, met with these forms, which he has published, we presume, in order to convince microscopists of his ability to produce the promised "entirely new work." From this specimen we have no doubt the "new work" will contain much that is very novel. A new edition and appendix to the "Synopsis" would be very acceptable; but of course we cannot say so much for an "entirely new work," of the merits of which we can only judge from the present communication. A good critical work on Diatomaceæ, reducing the spurious species, which the vanity of inexperienced writers has created, would be too much to expect, but not too much to desire.

Monthly Microscopical Journal.—The first volume of this journal is just completed, and for the six months furnishes 392 pages for comparison with the 426 pages of the *Quarterly Journal* for the preceding twelve months. Beyond this fact we do not purpose to institute comparisons, but will leave that task to the Fellows of the Society and the purchasers of the Journal. Probably had we counted lines instead of pages, the balance would have been in favour of the new Journal for six months against twelve. It is impossible for us to indicate the subjects which this volume contains, of interest to microscopists, for that could only be done by reprinting the contents. We cannot believe that any one interested in the literature of microscopy, or in the progress of microscopical science, would hesitate to expend eighteenpence a month for such a record.

Scale of the Eel.—We have heard it gravely asserted, and strenuously maintained, that eels are *not* furnished with scales. In controversion of this popular error we now furnish a figure of Eel scale, magnified to the same proportions as the scale of the Dace in our last number. It will be observed

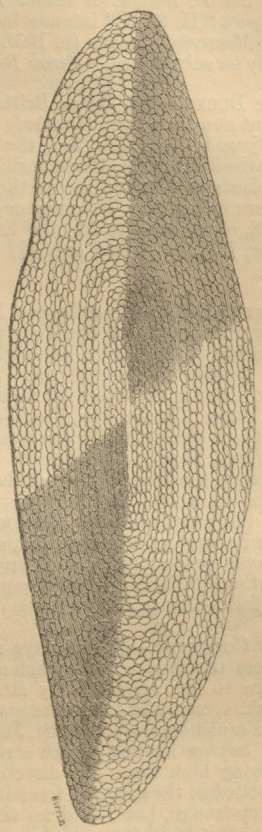


Fig. 132. Scale of Eel magnified.

that the scales of the Eel are very peculiar in form, being long and narrow, and the markings, instead of parallel concentric ridges, are moniliform series of ovals; they are of course very delicate and transparent, but undoubted scales. A piece of the skin may be mounted and the scales viewed *in situ*, those of the belly being most distinct.

Edinburgh Naturalists' Club.—The botanists and zoologists of Edinburgh have founded a Field Club, which is already in a fair way of reaching the number to which it is limited. It is composed of Professors and other members of the University, and amateur naturalists: Mr. Robert Brown, President; Dr. Black, Vice-President; and Dr. Edmonston, Hon. Sec. and Treasurer.

NOTES AND QUERIES.

Nightingales appear to be creeping further west in Devonshire. For some time past they have been occasionally met with on the eastern borders, but this year a pair have taken up their quarters at Broadclist, near Exeter.

Violets and Ash-trees (pp. 91, 166).—The Violet to which Mr. Tennyson alludes is evidently *V. odorata*, not *V. canina*, or rather *V. sylvatica*, which I suspect "H. S. M." intends by the former name. For *Mercurialis annua* (p. 166), *M. perennis* should surely be substituted.—*James Britten.*

Flora of Bucks.—Mr. James Britten publishes in the current number of the *Quarterly Magazine of the High Wycombe Nat. Hist. Soc.*, the first instalment of a revised list of Buckinghamshire plants, in which the plants peculiar to the north or south of the county are indicated. The number of species is raised to 808, of varieties to 30: the list published in November, 1867, contained only 777 species, and 22 varieties.

Fay-berry (p. 162).—My colleague Mr. Holland will, I know, excuse me for doubting the accuracy of his derivation of Fay-berry, although I have no supposition to offer in place of his. The word is given by Dr. Prior in the following forms:—Feabe, Fape, Fabe, Thape, Theabe, De-, Fae-, Fea-, or Feapberry; and it is evident that Fay-berry is but another spelling of Fabe-, Fape-, or Fae-berry. We want to find out which is the original form of the word; and whether that in which the "e" or the "a" is sounded, is the more ancient. The occurrence of the name in Lancashire is interesting, as Dr. Prior says it "seems to be confined at present to the eastern counties." "Fayberry-pie" becomes "Thapepie" in Norfolk.—*James Britten.*

Vagrant Cockatoo.—A few days since I was walking across the Green Park, when a noise overhead, strange to me, attracted my attention. At first I thought some water-fowl were making a journey from the ornamental water in St. James's to the Serpentine; but on looking up saw a rose-coloured Cockatoo flying high from the direction of Park Lane. It settled in the group of trees in the hollow near the sheep-trough, but I had no time to watch what became of it, neither could I say whether it had just escaped, or was living in the park in a semi-wild condition. Other readers of Science-Gossip may also have observed it.—*R. McLachlan, Lewisham*, July 3rd, 1869.

Why do Insects Fly to the Light?—J. G. Odell's experiment with the denizens of his aquarium no doubt shows that non-vegetarian creatures are attracted by light as well as the nectar-loving moths, and I have formerly noticed the same thing when I had an aquarium. The Chinese too, I believe, attract fish with lanterns. My suggestion was but a suggestion. Still, in the matter of the owls and nightjars, I must be allowed to be sceptical as to *their* being attracted by light, and fancy that *a moth* attracted by light was the object of pursuit, and cause of their collision with the window-pane. Fly-catchers and other birds will thus fly against a window by day. I cannot think an owl would be such an owl as to be attracted by light. I readily grant that there is something we do not yet understand about the attraction which light possesses for many creatures. In *possible* relation to this subject, I would ask why are *light* nights bad for moth-collecting and *vice versâ?* That they are so every collector knows.—*W. H.*

Bees.—Permit me to ask whether it is necessary to have twigs or sticks put into the hive prior to the swarm being shook into it. I ask the question as, on the 29th of June last my servant girl, in my absence, shook a swarm from a gooseberry bush without placing sticks. The bees, however, seem to have taken to the hive, and are very busy. I may add that this girl did it without the protection of any gauze dress: she was not stung, which to me seems miraculous.—*Joseph Lloyd Phelps.*

Cats.—The letter of my friend Mr. George Guyon, at p. 161, reminds me that when I was in Berkshire, as a boy, more than twenty years ago, I knew a large black cat who particularly affected snakes as his diet. I have seen "Tom" trailing some four-and-twenty inches of *Coluber Natrix* after him over a gravel walk, he having previously consumed the upper part of the wretched reptile. I never knew even him, though, touch any of the Batrachia proper; in fact it must be a matter of experience with every one that cats fight very shy indeed of frogs and toads, and notably of the latter. While on the subject of cats it may perhaps be worth while to put on record one or two instances of their sagacity which I have myself witnessed; and firstly, with regard to a little cat I have called "Brownie" (who is very well known to Mr. Guyon), and whom I believe to be one of the cleverest of her species that I have ever met with. To say that she begs for food like a dog, goes in to meals incontinently on the ringing of the hall bell, fetches my wife and me from our dressing-rooms if we do not enter the dining-room at once, growls like a dog at beggars and tramps if she sees them in the carriage-drive, &c., would be only to give her credit for what many other sharp cats do; but one proof of her reasoning powers is I think worth narrating:—My dining and drawing rooms are on opposite sides of the hall; which has, of course, to be crossed to go from one to the other. Now, one day the ladies of my family had gone in to luncheon just before me, and had closed the dining-room door; Brownie, it would seem, had not been quite quick enough in following, for she was shut out in the hall; and when I opened the drawing-room door, to my exceeding astonishment, I saw her on her hind legs, with one paw on each side of the handle of the dining-room door, *trying to turn it round*. Had she been merely shaking it, or clawing it, I should have thought very little of it; but she was making as deliberate an attempt to twist it round as I could have done. I ought to have waited and seen whether she succeeded, but I foolishly opened the door for her. I will say, quite candidly, that had I read this in a book instead of seeing it, I should have thought it a gross exaggeration. Secondly, I had another cat, named "Muff," who used to perform rather a clever trick. He would get upon the back of one of the cows (they did not seem to object to it) while they were grazing, and so got carried into the midst of the flock of starlings &c., which always follow cows when they are feeding: then selecting his bird, he would suddenly pounce upon it from the cow's back, and carry it off. Poor Muff! it was his one accomplishment. He ultimately came to grief in a trap, through his insatiable appetite for game.—*William Noble, Forest Lodge, Maresfield, Sussex*, July 6th, 1869.

Do Cats eat Reptiles?—I have known several instances where cats have eat both slow-worms and snakes as readily as they did eels. We have in South Wales a saying to the effect that "a May kitten will turn out a snake cat." It means that a kitten born in the month of May will, when grown into a cat, bring snakes into the house; and as all the lower class of Welsh have an idea that every kind of creeping thing, from the poor little harmless newt down to the wicked-looking viper, is venomous, and call every sort of reptile a snake, kittens born in May are usually destroyed. I had a large black cat once which caught slow-worms, efts (newts), and snakes. She, though *not* a May kitten, would bring her prey into the house, a by no means desirable accomplishment in a cat thus retrieving, for it is decidedly disagreeable to find part of a blind-worm under the seat of your chair, or see a half-dead ringed snake on the hearth-rug, when you come down to breakfast on a June morning. Puss generally eat a portion of both slow-worms and snakes, but I never remember seeing her attempt to taste a newt: she probably had done so in early life, and found its skin disagree with her. How very greedily some cats will devour eels; my cook used to declare she had more trouble in keeping the eels from the cat's clutches than any other fish; they would pull them out of the pan of water in the kitchen, or lift up the cover in the cellar to get at the fish which she laid on the flags to keep cool; and I actually saw a neighbour's cat take some live eels from a little pond in my garden. I had lost several gold-fish in an unaccountable way, when one day I saw a cat, who evidently did not mind wetting her feet—a point cats are said to be particular about,—walk into the water and bring out a good-sized eel. The pond was very shallow.—*Helen E. Watney, Anglesea House.*

Violets under Ash-trees.—Having unusual facilities for noticing the vegetation under ash-trees—our village name meaning "town of the ash-trees"—I have, since May, examined them very carefully. The following plants I found growing under *one* tree:—Ranunculus acris, *Viola canina*, *Viola odorata*, Polygala vulgaris, Geranium Robertianum, Melilotus officinalis, Veronica Chamædrys, Spiræa Ulmaria, Geum urbanum, Potentilla repens, Potentilla Anserina, Potentilla fragaria, Rosa canina, Rubus fruticosus, Gallium cruciatum, Primula vulgaris, Leontodon Taraxacum, Mercurialis perennis, Bellis perennis, Tussilago Farfara, Rumex obtusifolius, Tamus communis, Hypericum perforatum, and in the hedge-row, Dogwood, Hazel, Holly, Privet, and Whitethorn. Under another ash-tree I found growing side by side *Viola canina* and *Viola hirta*, and last spring I found the sweetest little bed of *Viola odorata*—which is by no means a common plant here—under an ash-tree, nestling among its roots. Besides the above-mentioned plants I found others, and altogether, in one evening, I had about seventy specimens, gathered solely from under ash-trees; so I have come to the same conclusion as "H. S. M." in the current number of Science-Gossip.—*W. J. Hill.*

Missel-thrush and Missel-toe (p. 164).—This is surely a misconception:—1. The Mistletoe is named from the Latin word *viscum*, from which we have our word viscid; its Saxon form was *mistelta*, which we have corrupted into *toe*. 2. The Missel-thrush (*Turdus viscivorus*) is so named because it feeds upon the berries of the Mistletoe plant; hence the word visci-*vorus*; from *viscum*, and *voro* to devour.—*A. H.*

Local Names of the Gooseberry.—I've a strong conviction that our word is a corruption of the French word *gros*, and equivalent to the Latin *crassus*; the currant and the gooseberry are both *ribes*: the currant or smaller berry, is corrupted from *Corinth*; the gooseberry is the gross or larger berry. The scientific name *Ribes grossalaria* is closely followed in the French *groseille*; but it cannot be doubted that the same word is the origin of both *gros* and *gross*. The local names *fay*, *feaps*, *feabs*, and *fabes* are called corruptions of *febris*, the Latin for fever, as, according to old Gerarde, the acidity of the gooseberry served as a febrifuge.—*A. H.*

Variable Weather.—In July we had snow in several parts of England, and in April I had a fine dish of mushrooms gathered in the open field. My landlady tried to make me believe I should be poisoned if I ate them; but Science knew better than Gossip, and I ate them for breakfast and enjoyed them. They had a nicer flavour than any I tasted last autumn.—*W. J. Hill.*

Cowslip.—I gathered a specimen of *Primula veris* in the spring which had twenty-four distinct blossoms on it. Is not that extraordinary?—*W. J. Hill, Trefonen Cottage, near Oswestry.*

New Aneroid Barometer.—The hourly self-recording Aneroid Barometer, just produced by the London Stereoscopic Company, appears to be a decided improvement in the construction of barometers. It combines an eight-day clock with an aneroid barometer, and between them revolves a vertical cylinder, having a paper attached, on which, by a pencil connected with the clock, the position of the barometer is marked every hour. This record shows the height of the barometer, whether it is falling or rising, for how long it has been doing so, and at what rate the change is taking place. The paper on the cylinder only requires changing once a week.

The Corn Cockle.—This plant, well named for the beauty of its flowers *Agrostemma*, or "the Crown of the Field," has been frequent this summer in our corn-fields. I would not now, however, so much notice the rosy-purple petals, or the fantastic prolongments of the calyx, as the great beauty of the silicious, one-celled, needle-like hairs which cover the styles. These are nearly upright, being articulated to the column by a short curved joint. Some of the upper ones are detached during the growth of the flower, and, mixing with the pollen, present their sharp points to the stigmata as if designed to excite or pierce them. Here is a new question for the physiologists, which they will not perhaps be thankful for, just now that so many others are on their hands. However, the style of the Corn Cockle is worth an attentive observation with the microscope for its beauty alone, which, in its kind, is scarce inferior to the well-known "Anther of the Mallow." The sharp little hairs might be easily detached by gentle pressure between the fingers, and transferred to a slip of glass for mounting, either dry or in balsam. They would then puzzle a professor, having much the shape of some diatoms, and with similar markings; this, of course, on a larger scale. They are not purely silicious, but sufficiently so to keep their form when dried, and to colour under polarized light.—*S. S.*

Sundew.—I read with some interest the answers of your correspondents to Mr. Spicer's inquiry respecting the irritability of the leaves of the Sundew (Science-Gossip, April and May, 1869), and I would be glad if you would insert a few lines from me in confirmation of this singular phenomenon. None of your correspondents seem to have personally observed the act of capture of a fly, and the mere fact of adhesion of small insects to the glutinous secretion on the hairs of the leaves is only what might naturally be expected, and is quite independent of the existence of any true irritability whatever, the possession of which by the species of Drosera is the point of interest. Like Mr. Spicer, my attention was attracted in the summer of 1863 to the passage in Withering's Botany describing the observations of Roth, Whately, and Gardom on this subject. Many authors do not allude to the matter at all; but Loudon, in his "Encyclopædia," remarks of the Drosera that "the leaf-hairs are very irritable, and close upon small insects that touch them, after which the leaf itself bends, and holds the dead insect imprisoned." My own observations, made in the bogs of Longford and elsewhere, are in accordance with Roth and Whately's experiments. In the *Drosera longifolia* especially, I saw a great number of the leaves inflexed, and with the hairs turned in, and *every one* of them contained some irritant substance, generally the dead body of an insect. On one occasion I was fortunate enough to witness the remarkable sequence of movements from the moment that an unlucky midge alit on the tempting but treacherous trap. The movements commenced in about ten minutes, and it was a curious sight to watch the elegant little hairs curving gradually from base to apex till they met in the centre, locking together, like miniature fingers, and thus securely imprisoning the poor captive. His struggles only served to increase the number of, and to strengthen his bonds. Mechanical irritation of the upper surface of the leaf will also cause the hairs, and finally the leaf itself, to bend inwards and downwards, but the time at which this result happens, after the application of the stimulus, seems to have some connection with the state of the weather, for the experiment succeeds best on a warm, sunshiny day.—*Walter G. Smith, Dublin*, July, 1869.

Skylark (*Alauda arvensis*).—During the present summer I have frequently noticed a skylark singing while perched on the edge of a notice-board standing in a neighbouring wheat-field. I have as often seen him standing on a post belonging to the fence, where he sings as merrily as if it were "from his watch-tower in the skies." I have never before known the lark to sing except on the wing; even the caged bird will often manifest his desire to be "at heaven's gate," by singing with fluttering and expanded wings. I have seen the same skylark sing while ascending, in fact he seems to accomodate himself to either circumstance.—*J. R. W. H., Wolverhampton.*

I have seen larks singing whilst perched very often.—*R. H.*

Macgillivray writes of a lark singing on a twig.—*S. G.*

A Curious Martin.—Amongst the flock of Hirundines which annually breed under the eaves of our buildings has arrived a *rara avis*, which consorts with a common martin (*Hirundo urbica*), but is quite different in colour, being of a brownish black with no white on its body. Its habits, formation of nest, sound of voice, mode of flight, &c., are precisely similar to those of its neighbours, but, unlike them, it commenced the business of nidification almost on its first arrival; I therefore concluded that it must be a variety of the common martin and not a distinct species. It was thought by some at first that it was the *Hirundo purpurea* of America; but the smallness of the bird, coupled with the dissimilarity of colour, is conclusive evidence that such a surmise must be erroneous.—*G. B., Hereford.*

[Is it a Swift?]

Glowworms.—Many readers of Science-Gossip may like to know that these pretty little creatures will live and thrive in a town garden. I turned several out in our garden here, and there is quite a little illumination from them every warm night. They keep to the exact spot in which I turned them out among stone-crop and ferns, which I keep well watered, as the glowworms are most luminous on damp nights.—*W. R. Tate, 4, Grove Place, Denmark Hill.*

Abnormal Erica.—I send you a specimen of a curious abnormal form of *Erica tetralix*, which I have never observed before. The corolla is divided into a number of separate petals. This condition was not confined to one solitary spray. There is a little clump of it, mixed up in a larger clump, bearing flowers of the normal form, and the contrast between the two is very striking. It is growing on the side of Beacon Hill in Charnwood Forest.—*Frederick T. Mott.*

[Not only is the corolla composed of separate petals, as stated by our correspondent, but there are other changes in the specimen forwarded; such as increased number of petals, intermediate forms between petals and stamens, adhesion of stamens to styles, open carpels from non-union of the edges, and other indications of a tendency to become "double." The double variety in cultivation no doubt originated from a specimen like that forwarded by our correspondent.—*M. T. M.*]

Blood.—I beg to thank Mr. Lewis for his paragraph on blood, and what he there states seems to me to confirm my ideas about the globules. The difference in size *may be* a fatal objection, though I think the red globules are not always of precisely the same size. Now Mr. Lewis says that a "high authority says that in the higher mammalia the globules without colour exist in a smaller proportion to what they do in man." May we not reckon animals in general *more healthy* than man? and then in cases of anæmia, and where weakness in general exists in man, the colourless globules increase in number, and the red ones are not so brightly coloured. In fact, the health has a great influence upon the state of the blood, or, perhaps, we might more properly say the state of the blood has a great effect upon the health. I see most writers consider the globules to be of two *distinct* kinds, though I do not think they satisfactorily point out their different uses. I do not pretend to argue the point, as I have not sufficient extent of observation; but I cannot help thinking when I read about the blood, and look at it, that the globules are really *all of one nature*, and that the oxygen in the air acts upon them in some way which causes the greater part to be coloured, and that in proportion as this is done, so the general health and strength are increased, and that where the contrary happens, so weakness of some kind exists.—*E. T. Scott.*

Habenaria bifolia.—I am afraid "M. C.," Kent, has taken a wrong view of his *Habenaria bifolia* (p. 162), from not having rightly understood the structure and economy of Orchids. That the pollen-masses were found on the labellum and calyx, as he mentions, I can quite believe, but that does not prove it to be a monstrous flower, as it is an ordinary occurrence with most Orchids, and particularly with *H. bifolia* and *H. chlorantha* from the wind blowing them against themselves and one another, or from some other accidental cause. *H. bifolia* is more subject to this. I have noticed from the extreme viscidity of the discs, and the easy way in which they can be displaced from their anther-cells, they being set wider apart than most other species. Another reason why the pollinia could not have been *growing* on the sepals and labellum is that the anther-cells must have been produced before the pollen could be, according to all morphological rules. As to the pollen-mass at the base of the column, that pretty certainly got placed there by some insect in the ordinary course of the fertilization of the flower. "M. C." mentions that the "glands formed a bulb where growing on the spur and labellum;" but he cannot have properly examined a fresh pollinia, or he would have noticed that all of them have these swellings or discs, whether in or out of their anther-cells; they forming a very important part of the economy of the plant. "M. C." considers also that the pollinia remaining fixed to the perianth, after a fortnight's drying, is another proof that they must have been congenitally attached; but the truth is that the longer the viscid matter of the rostellum is exposed to the air, the harder and firmer it gets. I have in my possession, now, specimens of *Anthrocera filipendulæ* with pollinia attached to their antennæ, and which are as firmly attached now as when they were caught five or six years ago. I hope "M. C." will not think that I make the above assertion without proof, as I can assure him that I have seen quite a hundred plants in the same condition as his *H. bifolia*, and particularly of that species. I expect that "M. C.'s" observations were called forth from reading Mr. Holland's paper on monstrosities, in the June number, where mention is made of a flower having produced a stamen from the base of the column; but that was an entirely different affair, as it was a complete stamen, having a filament, anther-cells, and pollen, and springing from the base of the column, which would be its natural place if the flower had been regular and symmetrical: this is the only case of the sort that I have met with of the thousands of *English* orchis flowers I have examined, though I have several times noticed it in the exotic species of the genus *Cypripedium*.—*Arthur B. Cole.*

The Prophet's Flower (*Amebia echioides*).—"Its yellow corolla has five purple spots, which the Mohammedans here believe to be caused by the tips of Mohammed's fingers in blessing the flower; but he must have had a very small hand to accomplish this."—*Dr. Brown, Lahore.*

Bee Query.—A hive of bees has apparently swarmed into the small cape placed above. What should be done with it as autumn approaches, the cape being too small to form a parent hive? Brood comb has also been found in a glass placed on another hive. The owner, not having met with the occurrence before, would be glad of any information as to how to act on such occasions, and also what may have been the cause of it.—*F. S.*

Herb Robert, or the Fetid Cranesbill.—This little wayside plant, which your correspondent Mr. James Britten notices in the June number of Science-Gossip, is very extensively used in some parts of South Wales as a domestic remedy in cases of erysipelas, and, as I have never seen any allusion made to its efficacy in medical works, I thought I would mention the fact here. It bears a provincial name in the Welsh language significant of its virtues. Erysipelas is always termed the "blast" by the Welsh peasantry, because they fancy it is produced by cold air—what we should call "sitting in a draught,"—and hence the common name of Herb Robert is "the herb of the blast," or, more correctly translated, herb for the blast, implying the herb that cures the blast. I have constantly known it used with wonderfully good effect in the form of an infusion, which the patient called "blast tea," and also in the form of a poultice. The scent of the freshly gathered herb is I think most disagreeable, but the flower growing in its favourite haunts, on old walls, and amid heaps of stones, is an especial favourite of mine. I have never heard it called "ragged robin;" but "wild geranium" and "the little cranesbill" are terms often used: cranesbill of course from the likeness borne by its fruit to the shape of that bird's beak. The name of the genus is derived from this resemblance, is it not? and more than one botanical writer draws attention to the singular appendages which the seed, or rather fruit, bears: a sort of screw which fastens the fruit into any little crevice or chink where it may happen to rest: one of the many instances exhibited in the floral kingdom of the great Creator's wisdom.—*Helen E. Watney.*

Something Like Beetles.—Utah is not only now plagued with locusts, but also with an insect called the "elephant beetle." A credible person, who returned from the neighbourhood of the Salt Lake recently, saw myriads of them covering the earth with their shining black bodies, and destroying everything which they met in their path. Even small animals, he was informed by the ill-fated residents, did not escape the ferocity of these hordes. Their bodies were crowded upon and wounded cruelly with the powerful antennæ, until they fell down exhausted by their struggles and loss of blood, when they were fastened upon by thousands and devoured. The entire carcase of a sheep was eaten, and the bones picked clean in three or four minutes, and it is said that a dead ox would be gobbled up in a quarter of an hour. So ferocious are these giant beetles, that mothers are afraid to let their children go out of the house unattended by a grown person. In their frequent bloody contests the wounded are devoured on the instant.—*Gardener's Magazine*, May 22.

Casting the Skin.—In page 136 of Science-Gossip for June, Mr. McIntyre gives an illustration of a curious slide of a spider's foot, which has been prepared from an animal on the point of shedding its skin. On looking over some old slides of mine to-day, I have come across a similar instance, though the object is a different one. In this case it is an entire silkworm prepared more especially to show the disposition of the trachea *in situ*; and as this creature must have been just about to change its skin, all the new prolegs, as well as others, and all the new spiracles, are seen within the old ones.—*Fred. H. Lang, Lower Redlands, Reading*, June 19th, 1869.

NOTICES TO CORRESPONDENTS.

All communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the Publisher. All contributions, books, and pamphlets for the Editor should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them.

M. J. G.—No. 2. Part of the moss (*Racomitrium*). 4. Basal portion of *Antennularia antennina*.

R. L. C.—Burmeister's "Manual of Entomology" (Churton, London, 1836).

F. E. N.—Certainly not.

J. W.—We cannot commence the practice of naming foreign plants.

C. E. O.—Our rule is "one at a time."

T. C. D.—We figured a similar triple pear in our volume for 1867, page 62.

W. H. L.—The true whitebait, according to Dr. Gunther, is a distinct species. Mr. F. Buckland states that much of what is sold as whitebait consists of the fry of several fish. See *Land and Water* for further particulars.

J. R. P.—If our correspondents read Gossip properly, they would not repeat queries already, and recently, answered; for "food for tortoise," see page 140.

G. H. H.—For the very good reason that the *Cirripedia* are not Molluscs.

W. K.—The best way of satisfying yourself is to keep tortoises and watch their habits, which you will find much more instructive and interesting than sending us a string of queries.

Ruddy Sheldrake in Norfolk.—Dr. L. informs us that the bird alluded to in our last was a veritable "escape."—See also p. 184.

J. A. B.—We do not care to introduce the subject.

J. R.—To print the paper read at your club would be merely to repeat what we have already done. See "Pin-centres and Rose-centres" in our volume for 1866, page 106; and numerous communications on cowslips, oxlips, and primroses during two or three years.

F. R. M.—The moths are *Trochilium tipuliforme*.—*H. K.*

M. H. O. P.—The beetle is *Phytonomus Rumicis* which may be bred from the dock.—*C. W.*

W. R. M.—The beetle is *Lampyris noctiluca*, male. The female is wingless and luminous, and is the common glow-worm.—*C. W.*

G. E. Q.—The gnat appears to be *Culex pipiens*.—*C. W.*

J. P.—The insects hatched from eggs found on the bramble are the larvæ of some Hemipterous insect (Tree Bug).—*C. W.*

W. G.—No aphis left in the box to determine the species.—*C. W.*

W. H.—The grass is a very poor, starved specimen of *Glyceria fluitans*.

T. A. H.—The ferns are *Lastrea dilatata* and *Lastrea Filix-mas*, var. *interrupta*, Moore.—*J. G. B.*

J. R. (Hitchin).—Not uncommon malformation of *Trifolium repens*, the pistil being foliaceous, and the calyx with a tendency to become so.—*B.*

E. C. J.—No. 1. *Polytrichum juniperinum*. 2. *Campylopus flexuosus*.—*R. B.*

J. L.—"Honey-dew" is applied to the extravasation of sap which takes place in hot, dry weather. The same term is also given to the clear honey-like fluid which is ejected by aphides, or plant-lice, from pores at the extremity of their bodies. The Aphis which infests wheat at this season is *Aphis avenæ*. Some information is given in Curtis's "Farm Insects" and Westwood's "Introduction to Modern Classification of Insects." In the latter—"The anal tubercles secrete a saccharine fluid, of which ants are very fond; and it is this fluid dropped upon the adjacent leaves, or the extravasated sap flowing from the wounds caused by the puncture of the insects, which is known under the name of Honey-dew." See also the correspondence in *Gardener's Chronicle*, July 3rd, 10th, and 17th, 1869. Some persons believe that "Honey-dew" is wholly, and always, caused by aphides.

G. R. W.—Probably you might obtain either *Canadian Entomologist* or *American Entomologist* of Trübner & Co., Paternoster-row, London.

EXCHANGES.

Ferns.—Young plants of *Platyloma atropurpurea*, *Adiantum pubescens*, *Cincinalis nivea*, *Mynopteris hirta*, and others, for Temperate and Hardy Foreign Ferns, or for *Cystopteris fragilis*, *Allosorus crispus*, *Woodsia ilvensis*, *Asplenium marinum*, or *Ceterach officinalis*.—George Edey, 38, High Street, Rochester.

Six Well-mounted Slides of either Recent or Fossil Diatoms, Insect Preparations, Opaque Objects, or Sections of Wood, will be given for a few unmounted Palates of *Trochus zizyphinus*.—G. Moore, Durham Road, Norwich.

Perch Scales.—Send stamped envelope to R. H. M., 18, Albert Buildings, Bath.

Pupa of *Dispar*, or *Neustria*, &c., for other Lepidoptera.—J. Purdue, Ridgeway Plympton, Devon.

Corallines.—Twelve different named species (nearly all polarize beautifully) unmounted, for six mounted objects.—C. E. Osborn, 28, Albert Road, Upper Holloway, N.

Fossils, Paleozoic and Mesozoic, chiefly Silurian, offered for good mounted slides.—H. M. Gwyther, Whittington, Oswestry.

British Ferns in exchange for other Ferns and British Moths and Butterflies.—Miss E. Hickson, 25, Latham Street, Preston.

Eggs of Grasshopper Warbler in exchange for other Eggs.—Thomas Robson, Front Street, Winlaton.

Vibrio tritici, in growing wheat, or other objects offered far Paste Eels.—A. N., 38, West Street, Fareham, Hants.

Wanted, in exchange for Good Microscopical Slides, the Volumes of the *Journal of Microscopical Science* containing Greville and Donkin's descriptions and plates of Diatomaceæ.—B. Taylor, Hon. Sec. Whitehaven Scientific Association.

Mounted Diatoms from American Deposits (Monmouth, Cherryfield; Duck Pond; French's Pond; Sing-sing, Hudson's River; Perley's Meadow; South Bridgton, &c.) for good Entomological Slides or Wood Sections.—"Portland," care of Editor of Science-Gossip, 192, Piccadilly.

Paulownia imperialis.—For Seeds, send stamped and directed envelope to "Oporto," Editor of Science-Gossip, 192, Piccadilly, W.

British Butterflies and Moths for exchange.—Address, S. H. Gaskell, Edward Street, Edgley, Stockport.

BOOKS RECEIVED.

"The Dental Register," for May, 1869. Cincinnati: Wrightson & Co.

"Transactions of the Woolhope Naturalists' Field Club for 1868." Hereford: *Times* office.

"The Monthly Microscopical Journal." No. VII. July, 1869. London: Robert Hardwicke.

"The Popular Science Review." No. XXXII. July, 1869. London: Robert Hardwicke.

"Land and Water." 178, 179, 180, 181, 182, 183.

"Scientific Opinion." Part VIII. July, 1869. London: Wyman & Sons.

"The Gardener's Magazine." Part XLIII. July, 1869.

"Le Naturaliste Canadien." No. VII. June, 1869. Quebec: 8, Rue de la Montagne.

"Quarterly Magazine of the High Wycombe Natural History Society." Vol. II., No. 5. July, 1869.

"The Canadian Entomologist." No. 11. June, 1869.

"American Naturalist" (Sea-side Number). No. V. July, 1869.

"American Entomologist." No. 11. July, 1869.

"Dental Register." Vol. XXIII. No. 6. June, 1869.

"A Guide to the Study of Insects," by A. S. Packard, jun., M.D. Parts VI., VII. Salem: Essex Institute.

Communications Received.—E. B.—E.—H. G.—F. W.—J. A. B.—R. H. F.—C. E. O.—F. S.—I. W.—T. H. W.—W. R. T.—J. H.—J. W. G.—C. P.—M. H.—G. B.—J. S.—B. B.—R. H. A.—C. C.—J. W.—C. H.—J. M. C.—J. P.—H. W.—H. C. R.—R. McL.—R.—A. A., jun.—J. W. G.—W. O.—B. T.—T. S.—C. F.—H. E. W.—J. H.—F. T.—M. D. B.—F. T. M.—J. W.—W. K.—R. H. M.—R. H.—N. F.—R. L. C.—C. D.—W. G.—H. B. P.—W. Y.—J. B.—G.—H. W.—A. A. (Chelmsford.)—J. K. J.—D. (Laleham.)—J. B.—H. R.—T. W. W.—C. E. O.—J. L. P.—W. H.—W. E. H.—H. M. G.—W. N.—W. W.—J. C. H.—H. U.—J. R. E.—G. B.—J. A. B.—T. C. D.—W. R.—J. P. G.—T. B. W.—H. C. R.—W. G. S.—J. R. W. H.—W. R. T.—F. S.—W. H. L.—E. H.—G. E.—A. A.—T. R.—M. H. O. P.—G. E. Q.—G. M.—S. S.—J. R.—A. B. C.—A. M. F.—E. C. J.—J. K. J.—E. L.—G. H. H.—R. B. B.—B. T.—W. A. F.—J. L.—J. R.—T. A. H.—E. T. S.—J. R. P.—W. J. H.—B. S. D.—J. E. H.—A. N.

UNDER THE SEAWEED.

By MAJOR HOLLAND, R.M.L.I.

THE spring tide which accompanied the last new moon has left a tide-mark of its own some four feet higher up the shelving, shingly beach in Stokes Bay than the stout ridge showing the high-water line of ordinary tides. Aided by a stiff sou'-wester, it has thrown up a most miscellaneous crop of *flotsam* and *jetsam*. Broken oars, cork floats from the fishermen's trawl nets, fragments of spars, and logs of shattered ship timber tell silent tales of rough work out at sea, and furnish a rare and abundant harvest to the wretched, ragged, weather-stained beach-combers, who are busily plying their precarious trade, furtively eyeing the coastguard man, who regards them with ill-favour as "a dubersome lot, not at all particular as to who things belongs to." Here are star-fishes (*Solaster papposa* and *Uraster rubens*), with sea grapes and cuttlefishes galore, aphrodites, crabs, whelks, hermits, a pipe-fish (*Syngnathus*), sea blubbers (*Acalephæ*), a dead gull, and even a huge angler (*Lophius piscatorius*) nearly five feet long, and in a very unsavoury condition, all driven on shore by stress of weather, and left wrecked and stranded high and dry, stewing and baking in the hot summer sun.

Here are cinders and vitrified metallic-looking clinkers from passing steamboats, with cocoa-nut husks and shells, and the green crests of golden pine-apples, contributions, no doubt, from the stewards of the West-Indian or Hamburg-American mail-packets that run through the Solent. This bleached and battered cabbage-stump, reduced by the rudest possible process of maceration to a snowy network of fibre, would be in itself a fortune to a lecturer on structural botany. How those merry little pusses with streaming golden tresses, who "kilt their skirts aboon the knee," and paddle in the pools on the margin of the ripple-marked sand, and run away screaming from "the white horses" that are beginning to roll in with the rising flood, and to break in a mimic surf on the beach, laugh when the said stump goes into our pocket, while out of the same pocket comes a common pickle-bottle, labelled onions, in large characters, which, after a loud pop with the bung, is gravely set down by a great matted and tangled coil of seaweed, nearly as thick as one of their waists, and looking, as it lies in a wavy line many yards long, with many similar lengths on either hand, like some great ocean cable "laid up" by old Father Neptune and his mates at the bottom of the deep, deep sea. A dozen white-winged yachts, schooners, yawls, and cutters are cruising between the Nab and the Needles; a mighty ironclad is running the measured mile; the towers of Osborne stand out in bold relief against the blue sky; and even the ivied walls of Norris Castle can be distinguished from the background of rich woodland behind them;—all is bright and beautiful and full of life; and so is this old cable-mat of sun-baked seaweed with which we have to do.

Projectâ vilior algâ—more worthless than the seaweed thrown out upon the shore. Perhaps if the desponding *Thyrsis* had possessed a seaside book and a microscope, or even a pocket lens, and could have shown his *Nerine Galatea* the wonders and beauties contained in the very commonest heap of alga, he would have selected some other standard of comparison. We lift up the mass, and out drops a four-horned spider-crab (*Pisa tetraodon*), with four strong horns on the front of his carapace, the

shorter pair forming a kind of penthouse over his eyes, which he carries farther back in his head than most of his congeners: he wears a growing sponge on his back, and a large and well-selected assortment of parasitic plants all over his body, after the fashion of his race.



Fig. 133. The Four-horned Spider-crab (male) (*Pisa tetraodon*), nat. size.

But let us look at the individual weeds of which this cable is composed. What a gathering of *Thallogens!* We have a score of varieties of marine plants, from cliffs and rocks, from the sea-surface, from the shallows, and from the deepest and darkest of the Nereids' gardens, all torn from their native habitats by the commotion caused in the depths below the last time that Æolus gave the winds a holiday, *et vastos volvunt ad litora fluctus;* and, borne on the lashing waves to the shore, the tide took them as it climbed up the slope, and pushed the whole lot of them before it in one indiscriminate *omnium gatherum*, rolling them over and over, and over again, like sailors making up a spare topsail, mixing them up with sand and gravel, and old rags, chips, and dead dogs, and all manner of *rejectamenta;* and having thus twisted them into ponderous vegetable hawsers, and reached its own highest limits, the bounds that it may not pass, with one final mighty heave it dashed them up upon the strand, and then ran away, and left them there for you dear young readers and ourselves to gossip over.

Draw out this long bundle of twisted rounded strings, all fastened to one little black pebble, a bit of hornblende rock: it is the Sea Whiplash, or Sea Catgut (*Chorda filum*); the "wee gigglets" there would call the strings "mermaids' laces." At a little distance this hank might easily be mistaken for a pennyworth of the leather boot-laces the hawkers sell in the streets. Then we have all the sea-wracks. Here is the Bladder-wrack (*Fucus vesiculosus*); the Serrated Wrack (*F. serratus*); the Knotted Wrack (*F. nodosus*), the air-bladders of which the children love to pop; and the Small Wrack (*F. canaliculatus*): all of which will be found depicted and described in the September number of SCIENCE-GOSSIP for 1865. The fronds of *F. serratus* are dotted with multitudes of little milk-white flattened spiral shells (*Spirorbis nautiloides*), members of the family *Amphitritæ*. The animals contained in them closely resemble the larger *Serpulæ*, and possess six branchial filaments of a rose-pink tint, and a pedunculate operculum, shaped like an angel's trumpet.



Fig. 134. *Spirorbis nautiloides* on *Fucus serratus*, nat. size.



Fig. 135. *Spirorbis nautiloides*, × 25.

Of weeds belonging to the littoral zone, we find a bunch of *Laurentia pinnatifida*, which the good people north o' Tweed call Pepper-Dulse, and eat with a relish, on account of its pungent flavour. Here are the grey-green tufts of *Cladophora rupestris*, and the purple-red branching fronds of *Chondrus crispus*, the well-known Carrageen moss, from which we extract a most nutritious jelly, to say nothing of bandoline for fixing rebellious plaits of hair and pointing our moustaches.

From a deeper zone come these:—Thong or Strap-weeds (*Himanthalia lorea*), and these tough strong brown ribbons of the Sea-wand (*Laminaria digitata*), which is sold for food in Scotland under the name of "tangle": the round leathery stems look like the thick ends of American cow-hide whips, and we remember in our boyish days how we used to cut them off for "tongos" to thrash the hostile *alumni* of a rival school, who sometimes charged us in the streets. But these stems can minister to the relief of far greater sufferings than they have ever been made to inflict: from them the chemist extracts *iodine*, one of the most valuable of medicines; moreover, the *Laminaria* stalks dried and used for fuel by shipwrecked mariners are said to be *the* sea-weeds that aided man in the discovery of glass. Two or three mussels have anchored themselves to the branching roots, and almost every one of them on being opened is found to contain a lively little Pea-crab (*Pinnotheres pisum*, fig. 136). It probably takes up its abode there to shelter its soft defenceless frame from hard knocks; it patronizes other bivalves, as the *Mactra* and *Modiola*, and especially the *Pinna*.



Fig. 136. The Pea-crab (*Pinnotheres pisum*).

Many fables have been written about it; the ancients supposed that in return for cheap lodgings it acted as a watch-dog, keeping a sharp look-out and warning its eyeless host of coming danger: with this idea Aristotle named it Πιννόφυλαξ, the Pinna's guard.

Almost buried beneath the roots, and cemented to the stone on which the roots have laid hold, is a thin, delicate, and translucent but poisonous member of the oyster tribe, an *Anomia* (ἀνόμοιος, unlike); so called from its two valves being totally different from each other in shape and size. The left or upper valve is convex and full, while the right or lower is scarcely one half as large, and is concave and bent about to adapt itself to the foreign body to which it is attached. In the lower valve near the hinge is an orifice, through which a byssus-like muscular band tipped with a shelly button or plug (concerning which the learned have had many disputes) passes, by which the creature effects its hold: it is often seen encrusted on the common oyster, and we rarely examine a root of *Laminaria* without finding a specimen: it is often called the Saddle Oyster; its lawful name is *Anomia Ephippium*.

Twisted amongst the roots are some limp unpleasant-looking flattened tubes four or five inches long, like slips of wet whity-brown paper powdered with sand. Put them into the bottle of salt water; they contain the pretty annelids *Eunice tubicola* (of Cuvier); we must examine them at home. We cannot pause to overhaul the seaweeds any longer, but let us roll back a yard or two of this mass, and see if there is anything under them.

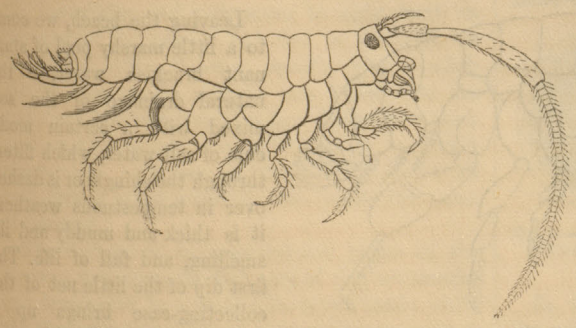


Fig. 137. The Sandhopper (*Talitrus locusta*), × 5.

The very ground seems to be alive. First of all let us secure a dozen or two of these Sandhoppers, *Talitri*, crustaceans of the order *Amphipoda*: these, in consequence of their jumping propensities, are distinguished by the title *Amphipoda saltatoria*. To economize space and to avoid repetition, we must refer our readers to the April number of this present year, in which, under the head of *Phronima*, will be found sundry details respecting crustaceans in general and *Amphipods* in particular.

The genus *Talitrus*, of the family *Orchestiidæ*, display the following characteristics, according to Messrs. Bate and Westwood, from whose great work on "The British Sessile-eyed Crustacea" the above and the three following figures are taken:—

"Superior antennæ short and rudimentary. Inferior antennæ with the basal joints fused into the facial wall of the cephalon. Mandibular palpi obsolete. Maxillipedes not unguiculate. First pair of gnathopoda simple; second pair small and feeble. Coxæ of third pair of pereiopoda as deep as the coxæ of the second, and divided into two equal lobes. Telson rudimentary;" and the specific character of *T. locusta*. "Superior antennæ only reaching to half the length of the penultimate joint of the peduncle of the lower. Last joint of the peduncle of the inferior antennæ nearly twice as long as the penultimate. First pair of gnathopoda robust and powerful. Second pair feeble, membranaceous, terminating in an imperfectly formed subchelate band: dactylos small and remote from the extremity of the propodos. Posterior pair of pleopoda very short. Telson rudimentary. Length half to three-quarters of an inch."

The first we catch is one of the above-described Sandhoppers (*T. locusta*), by far the commonest and most abundant members of the family *Orchestiidæ*. They are said seldom to enter the water voluntarily, but to dwell under the seaweeds at the top of high-water mark, or to burrow in the sand. We have found them in myriads in the cracks in the clay on the face of the cliffs, or high banks between Brown-down and Hill-head, at least three feet above the highest part of the beach. Although of a purely aquatic character, and requiring constant moisture, they die if kept long in water: they are carnivorous, and highly useful as scavengers; they have no objection to turn cannibals and eat each other; thus assisting the gulls and plovers in keeping down the undue multiplication of their legions. The French have named them *Puces de Mer:* the name given them, in allusion to the peculiar motion of their tail in leaping, is from the Latin *talitrum* (a flip or fillip).

The genus *Orchestia* present the general appearance of *Talitrus*, but have both pairs of gnathopods subchelate; the second pair in the male large and powerful; in the female, small and feeble; the telson single and well developed.

Specific character:—"Second pair of gnathopoda having the propodos tapering, the palm occupying nearly the entire length of the inferior margin, defined by a large tooth at the inferior angle." This species of the genus *Orchestia* (fig. 138) seems to be found chiefly on the coasts of Devon and Cornwall, where another genus, *Allorchestes*, is also found: we have not met with them here. For fuller details, and for drawings and descriptions of all the known

genera, we must refer the reader to the work from which we have quoted: the numbers, price 2s. 6d. each, can be purchased singly; published by Van Voorst. We are told of curious instances in which creatures of this order have been found in woods a considerable distance inland.

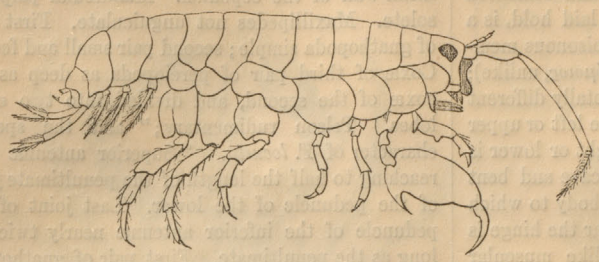


Fig. 138. *Orchestia Deshayesii*, × 5.

Next in abundance to the Sandhoppers come the Shorehoppers (*Orchestia littorea*, fig. 139). Specific character:—"Propodos of the second pair of gnathopoda having the palm convex, slightly oblique, with a small tooth at the inferior angle. Posterior pair of pereiopoda having the carpus and meros in the older males largely developed. Length $\frac{3}{10}$ of an inch." We have searched up and down for them in vain; doubtless they are to be found in the vicinity, but they are not under this particular bunch of weed we have been turning over, and it is no uncommon thing for them to be wanting in localities where *Talitri* are plentiful. The following figure is given for purposes of identification.

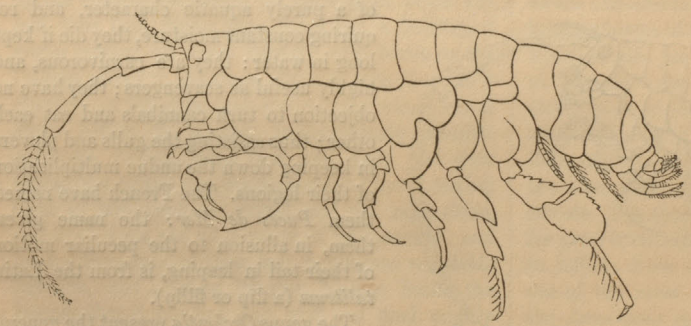


Fig. 139. The Shorehopper (*Orchestia littorea*), × 5.

Paley noticed the myriads of hoppers dancing in the sun, and "the religious mind of the observer saw in this the action of expressed gratitude for existence." Another writer says, "They hopped and leaped about, devouring each other as if for very wantonness." If these active little skippers literally "jump for joy," possessing the consciousness that at any moment their nearest and dearest relatives may seize "and inwardly digest them," they should certainly receive credit, even from Mark Tapley, for "being jolly" under such circumstances. But even if one could conceive that they consider it fun to be eaten up alive by their intimate friends, we must opine that they would rather not furnish meals for the carnivorous beetles, *Cillenum laterale* and *Broscus cephalotes*, which live with them and upon them.

The first of these is described as "coppery, shining; antennæ fuscous; their base and the legs testaceous; elytra ochraceous, with an æneous reflection": the second as "atrous; head and thorax shining." A score or two of flies, *Orygma luctuosa*, looking very much like common house-flies, but wet and shining, are found amongst the weed, some of them with parasitic *acari* adhering to them, which look like little drops of an orange-coloured fluid. But we must hasten onwards.



Fig. 140.
Cillenum laterale, × 4.



Fig. 141.
Broscus cephalotes, × 4.

Leaving the beach, we come to a little marshy pool of stagnant brackish water, — the natural drainage of the soil mixed with a certain modicum of salt water, which filters through the shingle or is dashed over in tempestuous weather: it is thick and muddy and ill-smelling, and full of life. The first dip of the little net of the collecting-case brings up a kicking, struggling thing, at first sight very like the preceding saltatory amphipods; but this is a truly aquatic genus, a natatory amphipod (*Gammarus locusta*). We are indebted to Mr. Spence Bate for our knowledge of the nest-building habits of certain crustacea; viz., *Podocerus pulchella*, *Amphitoë rubricata*, and others (*vide* "Report of Devon and Cornwall Natural History Society, 1857"), but our present specimen (fig. 142) is remarkable for her maternal solicitude for her young: swimming in the still pool with her little ones about her, she reminds us of a hen with her chicks.

The most striking peculiarity of this creature's appearance, contrasted with those previously described, is due to the two pairs of antennæ being nearly equal in length, the superior being rather the longer: the illustration shows her of the natural size, three-quarters of an inch. The juveniles fish out these *Gammaridæ* by the hundred, and take them home to be boiled for tea, believing them (as greater people have oftentimes done) to be shrimps. Ignorance is in this case undoubtedly bliss, and they are eaten with as much relish as though they were veritable *Crangonidæ*.

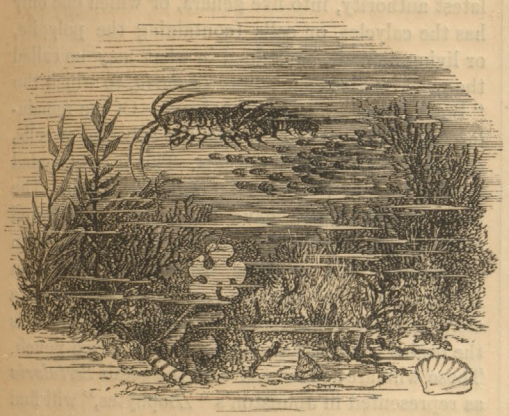


Fig. 142. *Gammarus locusta* and her brood.

By the way, I have rarely seen true shrimps in the markets hereabouts: the three varieties of prawns—viz., *Palæmon serratus*, with a long saw *rostrum* curving upwards, with its anterior half smooth on the upper side, and with seven to eight teeth on the rest of its extent, and five to six teeth on the under side; *Palæmon squilla*, with a much shorter and nearly straight saw dentated to the end; and the very much smaller *Palæmon varians*, with a very short saw, with four to six teeth above, and only two or three below — are all sold here, if below a certain size, under the name of shrimps.

The *rostrum* is an unmistakable badge of the Prawn; moreover, its first pair of feet are slender and terminated by a small didactylous hand; while the Shrimp proper (*Crangon vulgaris*) has no *rostrum* at all, and the first pair of feet are thick, and terminated by a monodactylous sub-cheliform hand. It is not advisable to attempt to enlighten a lady vendor of crustaceans, if she should persist in calling her prawns shrimps. *Experte credo.* "What! you want to tell me them be pra'ans an' not shrimps? Vive-an'-varty year this blesséd Michaelmas have me an' my old man travelled the country wi' 'em, and now for you to tell me as we don't know t'other from which!!"

Another dip, and up comes a brownish semitransparent creature something like a washed-out woodlouse: this (fig. 143) is *Sphæroma serratum*, a natatory *Isopod*, with horizontal swimming-plates on the last pair of false feet. Like his terrestrial representative, he can and does occasionally roll himself up in a ball.



Fig. 143. *Sphæroma serratum*, × 3.

But we must hurry on; we may not even stop to *think* of the polypes, and polyzoa, the tunicata, the cirripeds, the diatoms, and a hundred other things that pass through our hands in the short space of one hour.

And now that we have reached home, let us examine this rich-looking bunch of sea-grapes. If we placed them in a dessert-dish, garnished with vine-leaves, we might easily deceive the unwary. These are the eggs of the common Cuttlefish (the proprietor of the cuttle-bones on the beach), *Sepia officinalis*. Each one of these was deposited separately, and attached by its pedicle to the stalk of a sea-weed; others were added one by one till the cluster was completed. (Science-Gossip, 1867, fig. 211.) A cross section of one of these, made when it is new laid (fig. 144) displays (*a*) the horny exterior covering, (*b*) the smooth chorion, (*c*) the curiously folded vitelline membrane, containing (*d*) the watery-looking yolk. The latter, instead of being connected with the alimentary canal in the usual way (as in birds), is attached, or rather the embryo is attached, to it by the head, by a tube which passes between the cephalic arms, and communicates with the pharynx—"*adhæret ovo Sepia parte suo priori*," a fact observed and recorded by Aristotle.

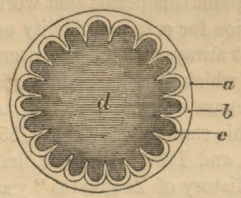


Fig. 144. Transverse Section of Ovum of *S. officinalis*.

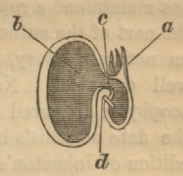


Fig. 145. Vertical Section of Embryo of *S. officinalis*.

In fig. 145, *a* shows the arms or tentacles, *b* the yolk communicating with the pharynx by the tube (*c*), and *d* the funnel or *infundibulum*, by which the water is expired. At this season most of the fry are upon the point of being hatched; it is interesting to detach one of the eggs, and, holding it by its pedicle, to slit the coverings down to the free end with a pair of fine-pointed scissors; allow the fluids to escape, then turn the bag inside out, and behold a little shapeless, motionless, gelatinous mass. Let this drop with a gentle splash into a basin of clean sea-water, and, hi! presto! what a transformation! In a moment the little quivering lump of colourless jelly turns spotted brown, unfolds, darts

about like a flash of lightning, and probably fires off the contents of his tiny ink-bag to let the wide world he has just entered see that he is a true *Sepia*.

From the limp unpleasant-looking tubes we flung into the bottle gorgeous annelids have come forth to show their rainbow hues: these are of the family *Eunicidæ*, and this fellow with four antennæ on his head and three on his neck is *Onuphis tubicola:* he is of a pale canary colour; the currents of his bright red blood are shown with remarkable distinctness passing from tail to head by the dorsal vessel; green and blue lights play about him when he is in motion, and on the slightest disturbance he goes through the most wonderful contortions, looking like the letter S in convulsions; he has deserted his old tube, and is beginning to manufacture a new one, stretching threads across from side to side of the pie-dish into which he has been poured out. It is a most curious process; but of this more anon; we have come to the end of our tether, and if in the small space we are permitted to occupy we have been able to aid the young seaside naturalist in finding and identifying any one object, we shall not regret the hours spent in endeavouring to describe for him the things he cannot fail to see the next time he goes out to hunt for specimens under the seaweed.

Bury Cross, Gosport.

SERTULARIANS.

IT is more than a hundred years since Ellis published his "Essay towards a Natural History of Corallines," and throughout this period that work has maintained a reputation for care and fidelity on the part of the author not always merited by writers on natural history, but which in this instance is well deserved. No separate work devoted to zoophytes appeared in this country between 1755, the date of Ellis's book, and 1838, when the first edition of Johnston's "History of Zoophytes" was published. This was another excellent work, which did good service in its time, and represented the advance which science, or classification, had made during the interval. Nine years later the second edition was produced, and this remained the only book of authority until a few months since, when the Rev. T. Hincks's "History of the British Hydroid Zoophytes," long promised, at length appeared. Ellis's "Corallines," and Lamouroux's "Flexible Corallines," included the organisms commonly called "Zoophytes," and these Johnston combined with Polyzoa, Sea Anemones, and other animals under the same vague title. Hincks adopts "Hydroid Zoophytes" to represent the order *Hydroida* of the class *Hydrozoa*. It is not our purpose to pursue the details either of the bibliography or classification of these organisms, but at once to select a single group, or family, called the *Sertulariidæ*, the polyparies or horny skeletons of which are freely cast upon our shores after rough weather, and are known to every observant rambler on the beach.

In a previous number (August, 1865) we published some remarks on this subject, accompanied by illustrations, which included a portion only of the Sertularians, with less regard to their microscopical characters than we hope now to furnish.

The family of Sertularians are easily recognized by their external form, divided, according to our latest authority, into five genera, of which one only has the calycles, or cells (containing the polypite, or living animal), imbedded in what may be called the axis. This is the genus *Thuiaria*, to which the "Bottle Brush Coralline" belongs. Of the remaining four genera, one only has the calycles, or cells, confined to one side of the axis. This is represented by the "Sickle Coralline" (*Hydrallmannia*). The three genera which have biserial, or two-rowed cells, are *Sertulariella*, in which the cells have an operculum; and of those without an operculum *Diphasia* has the capsules, or *Goniothecæ*, with a cleft margin, and internal pouch; whilst in *Sertularia* the orifice is plain, and there is no internal pouch. Those who are acquainted with the genus *Sertularia* as represented in Johnston's "Zoophytes," will find it thus divided into three genera, one of which retains the original name.

Taking these in the order in which we have already enumerated them, rather than the more accurate and scientific sequence adopted by Hincks, we commence with the "Bottle Brush Coralline" (*Thuiaria thuia*), of which we give an illustration of a small specimen, natural size (fig. 146). It is found attached to shells from deep water. The stem is erect and bare in its lower portion, from the falling off of the branches, whilst in the upper portion the branches remain attached, forming a cylindrical brush-like head. The cells, or calycles, are imbedded in the substance of the branches (fig. 147, *a*). The capsules are pear-shaped and smooth, springing from the base of the cells (fig. 147, *b*). For information of the structure and function of these reproductive bodies, we must refer the reader to Mr. Hincks's book.

Another species of this same genus is the "Sea Spleenwort" (*Thuiaria articulata*), in which the stem is naked below, and the branches above are arranged in a pinnate or feathery manner. It also occurs on shells and stones in deep water, and both are freely distributed around our coasts.

The "Sickle Coralline" (*Hydrallmannia falcata*) is the same as the *Plumularia falcata* of Johnston. Its external appearance is so very characteristic that it cannot well be mistaken for any other, and it is, moreover, so common everywhere, cast up by the tide, that the "skeleton" may almost always

be found on the shore. The stem is slender, and twisted like a corkscrew; the branches are all nearly of the same length, spirally arranged upon the stem, and when dry are curved like a sickle. The

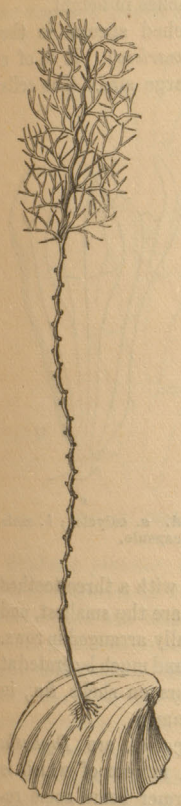


Fig. 146. *Thuiaria thuia*, nat. size.

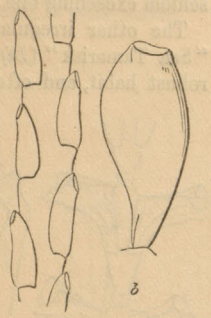


Fig. 147. *Thuiaria thuia*, magnified. *b*. capsule.

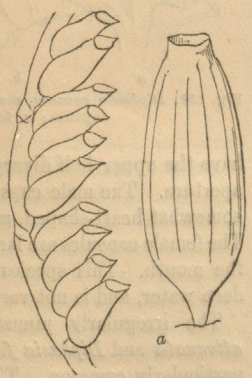


Fig. 148. *Hydrallmannia falcata*, magnified. *a*. capsule.

cells, or calycles, are only on one side of the branches, closely crowded together (fig. 148), and the capsules are abundant in the spring, pear-shaped, a little ribbed longitudinally when dry, with slightly contracted tubular mouth (fig. 148, *a*).

In all the remaining species which are included amongst Sertularians, the cells are projecting, and in rows on opposite sides of the stem. All the species which are now united in the genus *Sertulariella* (with one exception) are very small. The cells are distinctly alternate, and usually at a greater distance apart than in the other groups. The mouths of the cells are always toothed, and are closed by a prominent operculum.

The first species is the "Great Tooth Coralline" (*Sertulariella polyzonias*), which is the commonest of all, and occurs on shells, seaweeds, and other zoophytes all around the coast. It is very variable in size, and in the form of the calycles, sometimes not more than half an inch in length, and sometimes forming plant-like masses. The cells have four teeth on the margin (fig. 149), and the capsules are ovate, and wrinkled transversely throughout their length; the mouth of the capsules is tubular, surmounted by four teeth (fig. 149, *a*). The male and female capsules differ considerably in size and colour.

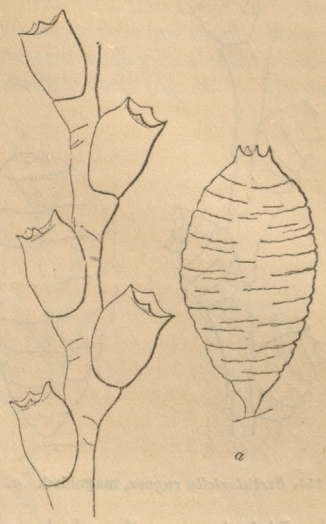


Fig. 149. *Sertulariella polyzonias*, magnified. *a*. capsule.

Another species with pinnate branches (*Sertulariella Gayi*) is found on the Cornish coast, and a few other localities. The cells are very similar, sometimes a little wrinkled transversely in this species, but the capsules are distinct, for the mouth is only two-lipped, and the upper half only of the capsule is transversely wrinkled.

Mr. Alder found a third species as a parasite on zoophytes, brought in by Newcastle fishing-boats, but it is too rare to require further notice here.

The "Snail Trefoil Coralline" (*Sertulariella rugosa*) is found on the "sea-mat," seaweeds, and other zoophytes. It is less than an inch in height, either erect or creeping. The cells are barrel-shaped, and ribbed transversely (fig. 150). The capsules are three or four times as large as the calycles, similarly shaped and ribbed, with a four-toothed orifice (fig. 150, *a*), one of the teeth being very minute.

Two other species are rare (*S. tenella* and *S. fusiformis*), and both very small.

The fifteen British species which are divided as equally as they can be between the two genera, *Diphasia* and *Sertularia*, might be classed artificially two or three ways into two divisions. For instance, some have the cells or calycles opposite each other in parts, others have them alternate. Again, although all are more or less branched, some have the branches pinnate, or arranged in a feathery manner, and in others the branching is forked or irregular. But the division into two genera which

Mr. Hincks has followed is the one we feel most disposed to adopt even for this superficial review.

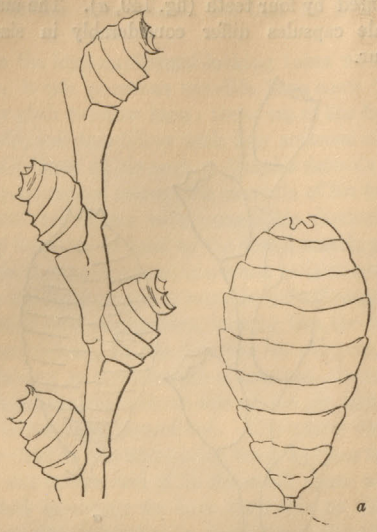


Fig. 150. *Sertulariella rugosa*, magnified. *a*. capsule.

In the *Diphasia* group the calycles are more or less decidedly opposite, as they are also in half the species included in *Sertularia*, but the mouths of the cells in the former are either entire, or only obscurely toothed, whilst in the latter either two-lipped or pointed. The capsules differ in the two genera, although this character is of very little service in determining empty skeletons. In *Diphasia* there is a spherical pouch in the upper portion of the capsule which is absent in *Sertularia*.

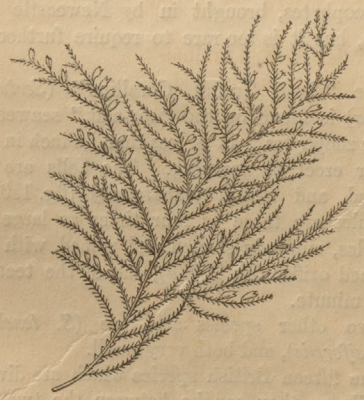


Fig. 151. *Diphasia rosacea*, natural size.

Of the seven species of Diphasia, two are irregularly branched, two irregularly pinnate, and three decidedly pinnate. Of those branching irregularly, the smallest and most delicate is the "Lily Coralline" (*Diphasia rosacea*). The shoots are very slender and delicate (fig. 151), chiefly parasitic on other zoophytes. Its texture is thin, and the cells are subject to folding and wrinkling when dry on this account (fig. 152, *a*). The capsules have eight longitudinal ridges, ending in as many projections at the apex (fig. 152, *b*, *c*). This is usually minute, seldom exceeding one or two inches in height.

The other irregularly branched species is the "Sea Tamarisk" (*Diphasia tamarisca*). It is of a robust habit, and often of a large size. The cells

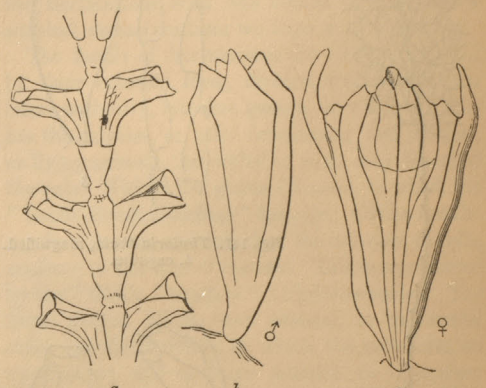


Fig. 152. *Diphasia rosacea*, magnified. *a*. calycles; *b*. male capsule; *c*. female capsule.

have the upper half diverging, with a three-toothed aperture. The male capsules are the smallest, and somewhat heart-shaped, generally arranged in rows. The female capsules are larger, and much lacerated at the mouth. This species occurs on shells, &c., in deep water, and is not very common.

The irregularly pinnate species are *Diphasia attenuata* and *Diphasia fallax*, neither of which is particularly common. The former bears some resemblance to the Lily Coralline, save that it is of a firmer texture, and the cells do not shrivel in drying. The capsules are strongly spiny at the apex, with six longitudinal ridges. Generally parasitic on other zoophytes.

Diphasia fallax is feathery in its ordinary condition, and usually bears a number of curled tendrils. The stems are thick and dark coloured, with plumose branches. The calycles are tubular and diverging; the capsules elongated, and surmounted by four stout spines. Hitherto found only on our northern coasts, attached to other zoophytes.

Of the three remaining species, which have regularly pinnate branches, *Diphasia alata* is rare. The cells are very small and peculiar, with the upper portion projecting abruptly. The other two are *Diphasia pinnata* and *Diphasia pinaster*.

The two forms described by Johnston and others as *Sertularia pinnata* and *Sertularia nigra* are now admitted to be male and female of *D. pinnata*. The height is often six inches or more, and of a dark colour when dry. The cells or calycles are rather small, springing but little from the stem, with a wide even mouth (fig. 153). The capsules are pro-

duced freely, the male only one-third the size of the female, and bluntly toothed at the apex; the female obovate and divided by longitudinal lines into four lobes. This species is almost confined to the coasts of Devon and Cornwall, in deep water.

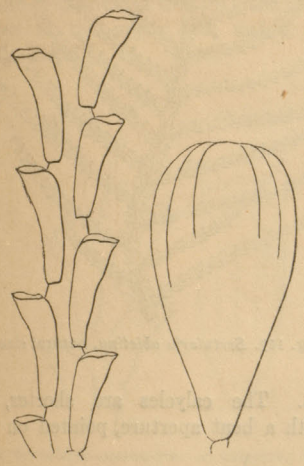
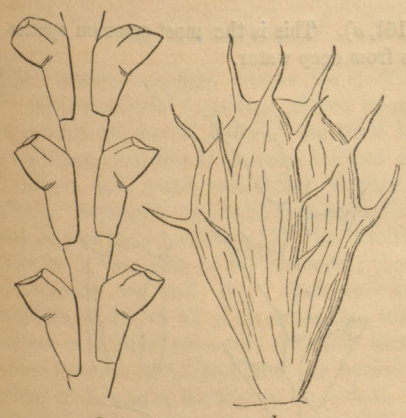


Fig. 153. *Diphasia pinnata*, magnified.

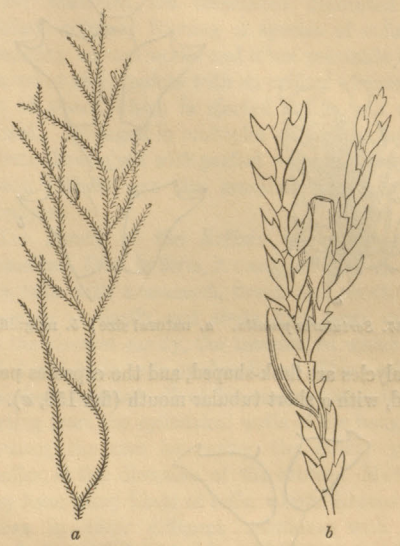
Diphasia pinaster, as now understood, includes also two species of Johnston, the male *Sertularia pinaster*, and the female *Sertularia margareta*. It attains from two to six inches in height, and is of a light horn colour. The cells or calycles are cylindrical, the upper half very abruptly turned outwards, so as to cause a fold at the angle (fig. 154). The male capsules are ovate, and almost quadrangular in the upper portion, with a spine at each angle. The female capsule is oval, with four longitudinal ridges, and about eight divergent spines in two series on the upper half (fig. 154, *a*). It is not an uncommon species, and seems to be well distributed.



a *b*

Fig. 154. *Diphasia pinaster*. *a*. calycles; *b*. female capsule.

The true Sertularias may be grouped in a similar manner. Four species have the cells more or less opposite in their arrangement, and only one of these has the branches regularly pinnate. This is *S. filicula*. Two species are very small and but slightly branched, and the other (*S. operculata*) is one of the commonest of zoophytes, and branches much and irregularly. The "Sea Hair Coralline" (*Sertularia operculata*) is very slender and delicate, the opposite calycles divergent, ending in a sharp point, with a small intermediate tooth (fig. 155). The capsules



a *b*

Fig. 155. *Sertularia operculata*. *a*. natural size; *b*. magnified.

are pear-shaped and large, with a circular lid (fig. 156). It is parasitic on seaweeds a little below low-water mark, and may nearly always be picked up on the shore.



Fig. 156. Capsule of *Sertularia operculata*.

The "Sea Oak Coralline" (*Sertularia pumila*) is seldom more than half an inch in height, and yet it attaches itself in such clusters to some of the larger seaweeds as almost to cover their stems. The calycles are in pairs forming a V-shaped figure. The capsules are ovate, with a tubular rim. This and its ally, *Sertularia gracilis*, are the two small and slightly branched species above alluded to. The latter is not more than half the size of its companion species, more delicate, and quite transparent. The cells are alike in form, but smaller. The capsule has a narrower neck and is less rimmed. Both are equally common on seaweeds and other zoophytes.

The "Fern Coralline" (*Sertularia filicula*), as already observed, has feathery branches, and oppositely arranged cells, or calycles (fig. 158). It is more slender and delicate than the majority of the pinnate

zoophytes. "It is cast on shore in large, tangled masses, and may be known at once by its zigzag stems, its peculiar colour, and its exquisite delicacy."

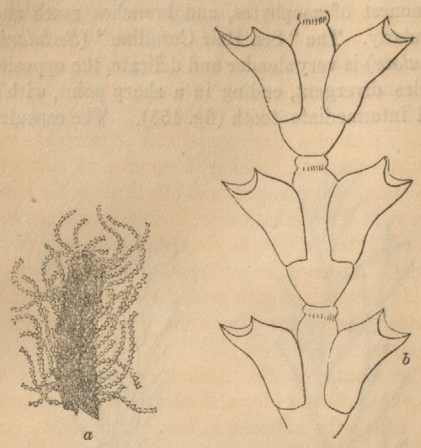


Fig. 157. *Sertularia pumila*. *a*. natural size; *b*. magnified.

The calycles are flask-shaped, and the capsules pear-shaped, with a short tubular mouth (fig. 158, *a*).

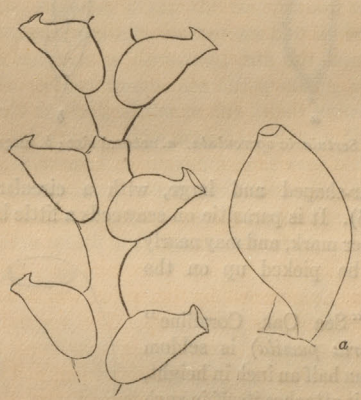


Fig. 158. *Sertularia filicula*, magnified. *a*. capsule.

Four species of *Sertularia* have the calycles alternate; two of these have branches pinnately arranged, and two have the branches much divided into secondary branchlets. Of the pinnate species, one (*Sertularia fusca*) is rare, smaller than the other, with the calycles in two rows, the mouths of the calycles turning alternately in opposite directions. The other, called the "Sea Fir Coralline" (*Sertularia abietina*), is sometimes a foot in height. The calycles are large, flask-shaped, with the mouths turned outwards and upwards (fig. 160). The capsules are ovate, with a short mouth, and smooth, or slightly wrinkled transversely when dry (fig. 160, *a*). Very common on shells, &c., from deep water.

The two remaining species have slender stems, with short branches somewhat spirally arranged. The branches again are much subdivided. The "Squirrel's Tail Coralline" (*Sertularia argentea*) is the smaller of the two, the branches more rigid

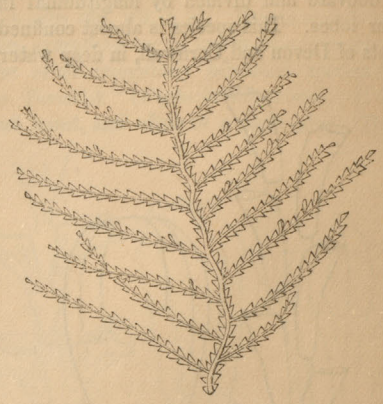


Fig. 159. *Sertularia abietina*, natural size.

and erect. The calycles are shorter, swollen below, with a bent aperture, pointed on one side

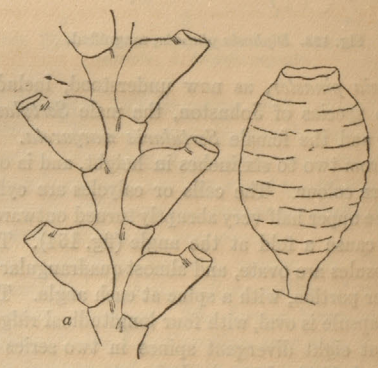


Fig. 160. *Sertularia abietina*. *a*. calycles; *b*. capsule, magnified.

(fig. 161, *a*). This is the most common species on shells from deep water.

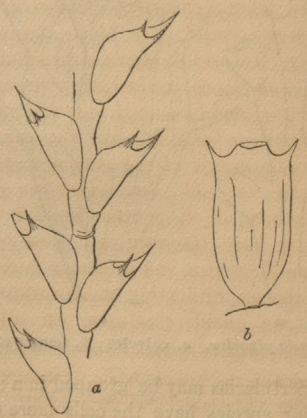


Fig. 161. *Sertularia argentea*. *a*. calycles; *b*. capsule.

The "Sea Cypress" (*Sertularia cupressina*) has long wiry stems, the branches drooping and less rigid than in the "Squirrel's Tail." The calycles are longer, tubular, and with a two-lipped aperture (fig. 162, *a*). The capsules are similar in both species, rather more cylindrical in this than the former, with two spines at the upper end, and a prominent mouth (fig. 162, *b*).

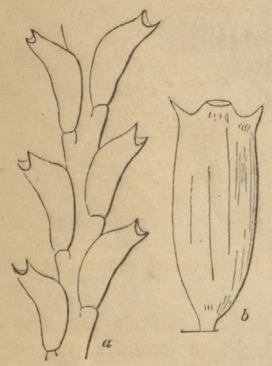


Fig. 162. *Sertularia cupressina*. *a*. calycles; *b*. capsule.

These brief characters with accompanying figures will, we hope, enable any one to name such specimens of the *Sertularians* as he may collect during his rambles on the shore. We have purposely omitted all description or reference to the living animals, as foreign to our present purpose; but those who desire to pursue the study, and become better acquainted with these interesting organisms, we refer, with confidence, to the Rev. T. Hincks's "History of Hydroid Zoophytes," recently published by Van Voorst; or an article on "Sertularian Zoophytes," by the same author, in the last number of the *Popular Science Review*.

SEA ANEMONES.*

THE modern aquarium exposes the spectator to many wonderful surprises. Coiled up against the transparent crystal walls of the basin he observes living creatures of the most brilliant shades of colour, and more resembling flowers than animals. Supported by a solid base and cylindrical stem, he sees them terminate like the corolla of a flower, as in the petals of the anemone: these are the animals we call *Sea Anemones*—curious zoophytes, which, as all persons familiar with the seashore may have observed, are now seen suspended from the rocks, and presently buried at the bottom of the sea, or floating on its surface. These charming and timid creatures are also called *Actinia*, as indicating their disposition to form rays or stars, from the Greek ἀκτὶν, a ray.

The body of these animals is cylindrical in form, terminating beneath in a muscular disk, which is generally large and distinct, enabling them to cling vigorously to foreign bodies. It terminates above in an upper disk, bearing many rows of tentacles, which differ from each other only in their size. These tentacles are sometimes decorated with brilliant colours, forming a species of collarette, consisting of contractile and often retractile tubes, pierced at their points with an orifice, whence issue jets of water, which is ejected at the will of the animal. Arranged in multiples of circles, they distribute themselves with perfect regularity round the mouth. These are the arms of this species of zoophyte.

The mouth of the Actinia opens among the tentacles. Oval in form, it communicates by means of a tube with a stomach, broad and short, which descends vertically, and abuts by a large opening on the visceral cavity, the interior of which is divided into little cells or chambers. These cells and chambers are not all of the same dimensions; in parting from the cylindrical walls of the body, they advance, the one increasing, the others getting smaller, in the direction of the centre. Moreover, they have many kinds of cells, which dispose themselves in their different relations with great regularity—their tentacula, which correspond with them, being arranged in circles radiating more or less from the centre.

The stomach of the sea anemones fulfils a multitude of functions. At first it is the digestive organ; it is also the seat of respiration; and is unceasingly moistened by the water, which it passes through, imbibes, and ejects. The visceral cavity absorbs the atmospheric air contained in the water; for the stomach is also a lung, and through the same organ it ejects its young! In short, the reproductive organs, the eggs, and the larvæ are all connected with the tentacles or arms. In the month of September the eggs are fecundated, and the larvæ or embryos developed. As Frédol says in "La Monde de la Mer," "these animals bear their young, not upon their arms, but *in* their arms. The larvæ generally pass from the tentacula into the stomach, and are afterwards ejected from the mouth along with the rejecta of their food—a most singular formation, in which the stomach breathes and the mouth serves the purposes of accouchement—facts which it would be difficult to believe on other than the most positive evidence."

"The daisy-like anemones (*Sagartia bellis*, Gosse) in the Zoological Gardens of Paris," says Frédol, "frequently throw up little embryos, which are dispersed, and attach themselves to various parts of the aquarium, and finally become miniature anemones exactly like the parent. An actinia

* Extracted from the "Ocean World," translated from the French of Louis Figuier, and published by Messrs. Chapman & Hall, to whose kindness we are also indebted for the illustrations to this article.



Fig. 163. Sea Anemones.

1, 2, 3. *Actinia sulcata.* 4. *Phymactes St. Helenæ.* 5. *Actinia capensis.* 6. *Actinia Peruviana.* 7. *Actinia St. Catharinæ.* 8. *Actinia amethystina.* 9. *Comactis viridis.*

which had taken a very copious repast ejected a portion of it about twenty-four hours later, and in the middle of the ejected food were found thirty-eight young individuals." According to Dalyell, an accouchement is here a fit of indigestion.

The lower class of animals have, in fact, as the general basis of their organization, a sac with a single opening, which is applied, as we have seen, to a great variety of uses. It receives and rejects; it swallows and it vomits. The vomiting becomes necessary and habitual—the normal condition, in short, of the animal—and is perhaps a source of pleasure to it, for it is not a malady, but a function, and even a function multiplied. In the sea anemone it expels the excrement, and lays its eggs; in others, as we have seen, it even serves the purposes of respiration; so that the animal flowers may probably be said to enjoy their regular and periodical vomit.

The sea anemones multiply their species in another manner. On the edge of their base certain bud-like excrescences may often be observed. These buds are by-and-by transformed into embryos, which detach themselves from the mother, and soon become individuals in all respects resembling her. This mode of reproduction greatly resembles some of the vegetative processes. Another and very singular mode of reproduction has been noted by Mr. Hogg in the case of *Actinia œillet*. Wishing to detach this anemone from the aquarium, this gentleman used every effort to effect his purpose; but only succeeded, after violent exertions, in tearing the lower part of the animal. Six portions remained attached to the glass walls of the aquarium. At the end of eight days, attempts were again made to detach these fragments; but it was observed, with much surprise, that they shrank from the touch and contracted themselves. Each of them soon became crowned with a little row of tentacula, and finally each fragment became a new anemone. Every part of these strange creatures thus becomes a separate being when detached, while



Fig. 164. SEA ANEMONES.

1. *Actinia dianthus.* 2. *Cereus gemmaceus.* 3. *Actinia bicolor.* 4. *Sagartia viduata.* 5. *Cereus papillosus.* 6. *Actinia picta.* 7. *Actinia equina.* 8. *Sagartia rosea.* 9. *Sagartia coccinea.*

the mutilated mother continues to live as if nothing had happened. In short, it has long been known that the sea anemones may be cut limb from limb, mutilated, divided, and subdivided. One part of the body cut off is quickly replaced. Cut off the tentacles of an actinia, and they are replaced in a short time, and the experiment may be repeated indefinitely. The experiments made by M. Trembley, of Geneva, upon the fresh-water polypi were repeated by the Abbé Dicquemare in the sea anemones. He mutilated and tormented them in a hundred ways. The parts cut off continued to live, and the mutilated creature had the power of reproducing the parts of which it had been deprived. To those who accused the Abbé of cruelty in thus torturing the poor creatures, he replied that, so far from being a cause of suffering to them, "he had increased their term of life, and renewed their youth."

The *Actiniadæ* vary in their habitat from pools near low-water mark to eighteen or twenty fathoms water, whence they have been dredged up. "They adhere," says Dr. Johnston, "to rocks, shells, and other extraneous bodies by means of a glutinous secretion from their enlarged base, but they can leave their hold and remove to another station whensoever it pleases them, either by gliding along with a slow and almost imperceptible movement (half an inch in five minutes), as is their usual method, or by reversing the body and using the tentacula for the purpose of feet, as Réaumur asserts, and as I have once witnessed; or, lastly, inflating the body with water, so as to render it more buoyant, they detach themselves, and are driven to a distance by the random motion of the waves. They feed on shrimps, small crabs, whelks, and similar shelled mollusca, and probably on all animals brought within their reach whose strength or agility is insufficient to extricate them from the grasp of their numerous tentacula; for as these organs can be inflected in any direction, and greatly lengthened, they are capable of being applied to

every point, and adhere by suction with considerable tenacity, throwing out, according to Gaertner, of their whole surface a number of extremely minute suckers, which, sticking fast to the small protuberances of the skin, produce the sensation of roughness, which is so far from being painful that it even cannot be called disagreeable.

"The size of the prey is frequently in unseemly disproportion to the preyer, being often equal in bulk to itself. I had once brought me a specimen of *A. crassicornis*, that might have been originally two inches in diameter, which had somehow contrived to swallow a valve of *Pecten maximus* of the size of an ordinary saucer. The shell, fixed within the stomach, was so placed as to divide it completely into two halves, so that the body, stretched tensely over, had become thin and flattened like a pancake. All communication between the inferior portion of the stomach and the mouth was of course prevented; yet, instead of emaciating and dying of atrophy, the animal had availed itself of what undoubtedly had been a very untoward accident, to increase its enjoyment and its chance of double fare. A new mouth, furnished with two rows of numerous tentacula, was opened up on what had been the base, and led to the under stomach; the individual had indeed become a sort of Siamese twin, but with greater intimacy and extent in its unions!"

The sea anemones pass nearly all their life fixed to some rock, to which they seem to have taken root. There they live a sort of unconscious and obtuse existence, gifted with an instinct so obscure that they are not even conscious of the prey in their vicinity until it is actually in contact, when it seizes it in its mouth and swallows it. Nevertheless, though habitually adherent, they can move, gliding and creeping slowly by successive contractile and relaxing movements of the body, extending one edge of their base and relaxing the opposite one.

At the approach of cold weather the *Actiniadæ* descend into the deepest water, where they find a more agreeable temperature.

We have said that the sea anemones are scarcely possessed of vital instinct; but they are capable of certain voluntary movements. Under the influence of light, they expand their tentacles as the daisy displays its florets. If the animal is touched, or the water is agitated in its neighbourhood, the tentacles close immediately. These tentacles appear occasionally to serve the purpose of offensive arms. The hand of the man who has touched them becomes red and inflamed. M. Hollard has seen small mackerel, two to three inches long, perish when touched by the tentacles of the Green Actinia (*Comactis viridis*, Allman). This is a charming little animal; "the brilliancy of its colours and the great elegance of its tentacula crown when fully expanded," says Professor Allman, "render it eminently attractive; hundreds may often be seen in a single pool, and few sights will be retained with greater pleasure by the naturalist than that presented by these little zoophytes, as they expand their green and rosy crowns amid the algæ, millepores, and plumy corals, co-tenants of their rock-covered vase."

The toxological properties of the Actinia have been attributed to certain special cells full of liquid; but M. Hollard believes that these effects are neither constant enough nor sufficiently general to constitute the chief function of these organs, which are found in all the species and over their whole surface, external and internal. Though quite incapable of discerning their prey at a distance, the sea anemone seizes it with avidity when it comes to offer itself up a victim. If some adventurous little worm, or some young and sluggish crustacean, happens to ruffle the expanded involucrum of an actinia in its lazy progress through the water, the animal strikes it at once with its tentacles, and instinctively sweeps it into its open mouth. This habit may be observed in any aquarium, and is a favourite spectacle at the "Jardin d'Acclimitation" of Paris at noon on Sunday and Wednesday, when the aquatic animals are fed. Small morsels of food are thrown into the water. Prawns, shrimps, and other crustaceans and zoophytes inhabiting this medium chase the morsels as they sink to the bottom of the basin; but it is otherwise with the Actinia; the morsels glide downwards within the twentieth part of an inch of their crown without its presence being suspected. It requires the aid of a propitious wand, directed by the hand of the keeper, to guide the food right down on the animal. Then its arms or tentacles seize upon the prey, and its repast commences forthwith.

The Actinia are at once gluttonous and voracious. They seize their food with the help of the tentacula, and engulf in their stomach, as we have seen, substances of a volume and consistence which contrast strangely with their dimensions and softness. In less than an hour M. Hollard observed that one of these creatures voided the shell of a mussel, and disposed of a crab all to its hardest parts; nor was it slow to reject these hard parts, by turning its stomach inside out, as one might turn out one's pocket, in order to empty it of its contents. We have seen in Dr. Johnston's account of *A. crassicornis* that when threatened with death by hunger, from having swallowed a shell which separated it into two halves, at the end of eleven days it had opened a new mouth, provided with separate rows of tentacula. The accident which, in ordinary animals, would have left it to perish of hunger, became in the sea anemone the source of redoubled gastronomical enjoyment.

"The anemones," Frédol tells us, "are voracious and full of energy; nothing escapes their gluttony;

every creature which approaches them is seized, engulfed, and devoured. Nevertheless, with all the power of their mouth, their insatiable stomachs cannot retain the prey they have swallowed. In certain circumstances it contrives to escape, in others it is adroitly snatched away by some neighbouring marauder more cunning and more active than the anemone.

"It is sometimes observed in aquariums that a shrimp, which has seen the prey devoured from a distance, will throw itself upon the ravisher, and audaciously wrest the prey from him and devour it before his eyes, to his great disappointment. Even when the savoury morsel has been swallowed, the shrimp, by great exertions, succeeds in extracting it from the stomach. Seating itself upon the extended disk of the anemone, with its small feet it prevents the approach of the tentacles, at the same time that it inserts its claws into the digestive cavity and seizes the food. In vain the anemone tries to contract its gills and close its mouth. Sometimes the conflict between the sedentary zoophyte and the vagrant crustacean becomes serious. When the former is strong and robust, the aggression is repelled, and the shrimp runs the risk of supplementing the repast of the anemone."

If the Actinias are voracious, they can also support a prolonged period of fasting. They have been known to live two and even three years without having received any nourishment.

Although the sea anemone is said to be delicate eating, man derives very little benefit from them in that respect. In Provence, Italy, and Greece the Green Actinia is in great repute, and Dicquemare speaks of *A. crassicornis* as delicate food. "Of all the kinds of sea anemones, I would prefer this for the table; being boiled some time in sea-water, they acquire a firm and palatable consistence, and may then be eaten with any kind of sauce. They are of an inviting appearance, of a light shivering texture, and of a soft white and reddish hue. Their smell is not unlike that of a warm crab or lobster." Dr. Johnston admits the tempting description, and does not doubt their being not less a luxury than the sea urchins of the Greeks, or the snails of the Roman epicures, but he was not induced to test its truth. Rondeletius tells us, having, as Dr. Johnston thinks, *A. crassicornis* in view, that it brings a good price at Bordeaux. *Actinia dianthus* also is good to eat, quoth Dicquemare, and Plancus directs the cook to dress it after the manner of dressing oysters, with which it is frequently eaten. *Actinia coriacea* is found in the market at Rochefort during the months of January, February, and March. Its flesh is said to be both delicate and savoury.

British Association.—The meeting for next year (1870) will be held at Liverpool, under the presidency of Professor Huxley.

FLOWERS OF THE OCEAN.

"Thou boundless, shining, glorious sea,
With ecstasy I gaze on thee,
And as I gaze, thy billowy roll
Wakes the deep feelings of my soul."

From the German.

THE study of ocean flowers, commonly called sea-*weeds*, is a very interesting one, and attractive even to those who only seek the excitement of looking on pretty things. Now, when the town is everywhere emptying itself of its living inhabitants, and casting them on the seashore, one may hope to be forgiven even for indulging in a little commonplace gossip about the very common things to be found in such localities.

Algæ, or seaweeds, are distinguished by their colour. They are divided into three classes—the red, the olive, and the green: I dare say some of my readers will here exclaim, as a young lady friend of mine at Tenby did, "Why, olive is a shade of green!" True, but neither olive nor green are primary colours. Green is a secondary colour formed by a combination of blue and yellow, and the olive-coloured seaweeds, the *Melanospermæ*, which grow upon rocks, exposed to the rise and fall of the tides, belong to a different class, to the *Chlorospermæ* or green *Algæ*.

Although I repudiate all intention of attempting to be learned in this paper, I must begin my description in due form; therefore take one of the olive-coloured weeds of the order *Fucaceæ*.

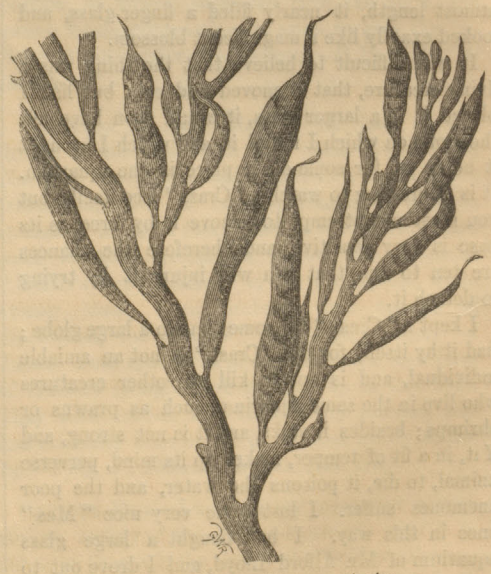


Fig. 165. *Halidrys siliquosa*, nat. size.

There is a little bushy-tufted, olive-coloured sea-plant, found on the rocks, called *Halidrys siliquosa*, a nice long name; but I really never heard a local

or English one given to this weed. It is very plentiful on the Welsh coast, and is interesting to the naturalist on account of the numberless small zoophytes that are to be met with on its fronds. Its air-vessels resemble pods, and from this likeness comes the specific name of *Siliquosa*; "Halidrys" being taken from two Greek words signifying oak-trees, and certainly the tiny tufts fixed on the stones at low-water mark by an expanded disk do resemble Lilliputian oak-trees. The beautiful fairy-like plumes of the *Plumularia cristata* are found on this seaweed in full perfection. I have seen some of these delicate zoophytes in an aquarium, but they never live long in one.

When staying at Little Hampton on the Sussex coast a few years ago, I used to amuse myself by collecting all the seaweeds and uncommon objects of the seashore, for they were mostly novel to me then, that I could find, and, keeping them for a short time in sea-water, which I carefully changed every day, to study their wonderful construction at my leisure. I think I must have filled all the finger-glasses at the Beech Hotel with my specimens. The kind old landlady humoured my invalid fancies, and the window-seats and tables in my drawing-room looked, when the sun was shining on these impromptu aquariums, rather like a chemist's shop. The colours of some of the sea anemones are singularly lovely; they are aptly called living flowers, *Anthozoa*. I shall never forget a Crass I found there. When very anxious for its dinner—that is, fully extended—its tentacles expanded to their utmost length, it nearly filled a finger-glass, and looked exactly like a magnificent blossom.

It was difficult to believe that the thing was a living creature, that it moved and eat; but had I placed it in a larger glass, it would soon have left the stone on which I found it, and which I brought it home on, for some other place in the aquarium. It is interesting to watch a "Crass" free itself; but you must not attempt to remove it by force, as its base is very sensitive, and therefore the chances are ten to one that you will injure it by trying to detach it.

I kept a "Crass" for some time in a large globe; had it by itself, for the "Crass" is not an amiable individual, and is apt to kill any other creatures who live in the same aquarium, such as prawns or shrimps; besides it sulks, and it is not strong, and if it, in a fit of temper, makes up its mind, perverse animal, to die, it poisons the water, and the poor anemones suffer. I lost some very nice "Mes" once in this way. I had bought a large glass aquarium of Mr. Alford Lloyd, and I drove out to Southsea to fill it. I knew I could find some of the *Actinia Mesembryanthemum*, called for brevity "Mes" there. I had a "Crass," sole occupant of this large Crystal Palace.

My Crass sulked, he shut up, he evidently disliked the *Actinia*, and, to make short this history, he died in the aquarium, and most of my pretty sea-flowers followed his bad example.

The Sea thong, as the fishermen call the *Himanthalia lorea*, is a curved cup-shaped seaweed; its long, strap-shaped, branched filaments spring from the middle of a small green cup, and though it is by no means an ornamental object in one's collection, still, for the sake of its quaintness, I say get a specimen. It is very common.

The red weeds are the most beautiful when mounted, therefore collectors (misnamed) who only care to bring away with them little scraps of pretty coloured weed, mostly seek for *Bonnemaisonia* and *Plocamium*, varied by an occasional bit of grass-green *Ulva* or *Cladophora*, throwing aside all the more sombre-hued specimens of the olive-green class, such as I have already described.



Fig. 166. *Plocamium coccineum.*

Of all the favourite "weeds" which the casual visitor picks up and carries home as a memento of the sea, none is more beautiful or common than that which botanists call *Plocamium coccineum*. It is of a beautiful crimson hue, when growing in deep water, but very soon after it has been cast on the shore it loses its brilliancy, becomes bleached by the sun, and ultimately subsides into a dirty white. Darker in colour, perhaps less common, more feathery, but scarcely less beautiful, is *Dasya coccinea*. But the large leaf-like fronds of the *Delessaria sanguinea*, more like delicate crimson oak-leaves, and as large as oak-leaves, are regarded as a treasure, especially if the form and colour approach to perfection, and the margin is comparatively unbroken. But, alas! during the calm sunny weather when the citizen seeks the shore the treasures of the deep are not cast up in such profusion as during the blustering days of March, and such "fair-weather sailors" are compelled to rest content with what they may find, and be thankful.

But to return to the more sombre weeds, after this long digression.

The common Wrack is another member of the fucus tribe, and there is not a child who has been at the seaside but knows this seaweed, and has probably tried some experiments with it in the frightening line on a nervous nurse or younger sister, by slyly throwing a handful of its dark air-vessels into the fire.

It is easily distinguished by these same air-vessels on the fronds, and a midrib which runs up the centre of the frond, although there is another *algea* very like it, the *Fucus nodosus*, but in this last the midrib is wanting.

The Wrack is to be met with on every coast. It is the most common, and I may add the most useful, of all seaweeds. It covers the rocks at the Mumbles, and lines the beach with a dark fringe of brown all along Carmarthen Bay; I made its acquaintance there early in life, and having been told by an old sailor on the sands to carry a basketful home, and put it on the kitchen fire "when the cook had turned her back," like a good, obedient little girl, followed his directions. Cook was dishing up when I entered her domain, and stared at my unexpected appearance; but, thinking I had come in late from the beach, and wished to place my basket in the kitchen, *turned her back* to deposit a couple of fowls on the dresser, when into the fire went the "Bladder-wrack." Poor cook! the heat of the kitchen, and sundry cordials which she took for "the spasms," had made her nerves weak; she gave a loud scream as the wrack exploded, and let the dish, fowls and all, drop on the floor. I scampered off in mortal terror, and dined, I remember, that day in a lumber room on bread and water, mentally blessing the old sailor for his sage advice.

The Scotch and Irish are much better acquainted with the valuable properties of this seaweed than the Welsh are; they use the "Kelp-ware" and "Black-tang" (as they term it) on their farms and potato-gardens—it makes capital manure; but in Wales it is allowed to dry upon the shore, wasting its iodine on the desert air. Darwin, writing of this fucus at *Tierra del Fuego*, says that it has saved many a ship from being wrecked on that most dangerous coast, by marking out the sunken rocks to which it clings. It floats like a buoy on the surface of the water, rendering useful service to navigators.

When looking for seaweeds and sea anemones, I always make a practice of poking up everything in the shape of shell that comes in my way. I bring home "a vast amount of rubbish," doubtless, as a person once, more truthfuly than politely, told me; still I find many grains of wheat in the chaff. I assure you it does well for the experienced and scientific who have a good collection to pass by with a shrug of mild contempt the ignorant health-seeking, sand-grubbing mortal who carries a heavy wallet, but depend on it the best way to gain enjoyment and instruction at the seashore is to bring home all you find, then study, class, and arrange them in your own den. There are many useful inexpensive books to be had which will aid the young student, but I very strongly advise people to use their own eyes, watch the living specimens, note down all they observe, and then compare their experience with the knowledge recorded by others.

Helen E. Watney.

ZOOLOGY.

The Scallop (*Pecten opercularis*).—As a proof of the tenacity of life possessed by this species, a fisherman assured me that he once put a quantity in a bag into a cupboard and forgot them, till, after the lapse of a week, turning them out he found them alive.—"*A Year at the Shore.*"

The Feather Star (*Comatula rosacea*).—In infancy the Feather star is seated at the extremity of a long slender jointed stalk, attached at its lower end, whence it rises erect, like a plant. Indeed the whole animal, in this condition, with its cup-like base and elegantly incurving arms, seated on its tall stem, has so close a resemblance of outline to a flower, that the fossil specimens, which are very numerous, and of large size, are known as Lily-stones, and technically as *Encrinites*, which word has the same allusion. After a while the radiating portion, or flower, separates from the stalk, and swims freely, contracting its arms to give the impulse, in the manner of a Medusa.—*P. H. Gosse*, "*At the Shore.*"

Wonders of the Deep.—One haul of our dredge in the soft warm oozy chalk mud off the North of Scotland brought up from a depth of 500 fathoms upwards of forty specimens of vitreous sponges. Many of these were new to science, and some of them resembled closely the beautiful "Venus's flower-basket" of the Philippines, while among them were probably two species of *Hyalonema*, the strange "glass-rope sponge" of Japan. Four specimens of this wonderfu new form of vitreous sponge were brought up in this haul. They were loaded with their glairy sarcode, and had evidently been buried in the ooze nearly to the lip.—*Prof. W. Thomson, in Ann. Nat. Hist.*

Curious Egg.—I have in my possession a very curious variety of the Yellow-hammer's egg; it is not more than half the size of the Gold-crest's egg, of a dirty white, mottled over with yellowish buff, and spotted at the small end with ash colour. It was taken by a friend of mine from a nest which contained four eggs; the remaining three were all of the usual colour.—*J. W., Brighton.*

Sturgeon in the Wye.—I understand from Mr. Alexander Miller, lessee of the Duke of Beaufort's salmon fisheries in the Wye, that a Sturgeon was caught on Tuesday last at Tintern abbey, a few miles above Chepstow. The fish was seven feet long and weighed 128 pounds.—*F. Buckland, in "Land and Water."*

The Common Pea Crab (*Pinnotheres pisum*) is an inhabitant of our own coasts, and frequently found residing within the shell of the common edible mussel; but it is very remarkable that the female crabs are very much more numerous than the males, and that, although the male crab may be at times captured at a distance from his strange lodging, we know of no instance of a female being taken in any situation but within the shell of some mollusc.—*Crab, Shrimp, and Lobster Lore.*

Defence of Colias.—I must say a word in defence of my friends the *Colias* butterflies. The writer of a paragraph in the Dec., 1868, number of Science-Gossip mentions having caught fourteen specimens of the Edusa in one week. Now, although they may occasionally be comparatively common in the south of England, it is not always the case, and in some parts, including the locality from which I write, the Edusa is scarce, and the Hyale or Europome much more so. I have never seen one of the latter on the wing. Considering how many enemies they already have in birds and cold winters, not to include the wanton destruction by boys, it does seem a pity to kill so many, when probably a much smaller number would suffice the collector, if carefully caught; and I think your correspondent must have done his best to exterminate the Edusa for the present from the neighbourhood he mentions. As the pursuit of natural history becomes increasingly popular, it behoves all true lovers of nature to set the example of preserving, rather than destroying, the rarer kinds of both plants and animals.—*Falmouth*, Aug. 9th, 1869.

Sand Worm (*Pectinaria Belgica*).—"On the outside sands," says Professor Kingsley, "between the end of the Marina and the Martello tower (at Hastings), you may find at very low tides great numbers of a sand tube, about three inches long, standing up out of the sand. I do not mean the tubes of the Terebella, so common in all sands, which are somewhat flexible, and have their upper end fringed with a ragged ring of sandy arms; those I speak of are straight and stiff, and ending in a point upward. Draw them out of the sand—they will offer some resistance—and put them into a vase of water; you will see the worm inside expand two delicate golden combs, just like old-fashioned back-hair combs, of a metallic lustre, which will astonish you. With these combs the worm seems to burrow head downward into the sand; but whether he always remains in that attitude I cannot say. His name is *Pectinaria Belgica*. He is an annelid, or true worm, connected with the serpulæ and the sabellæ, and holds himself in his case like them, by hooks and bristles set on each ring of his body. In confinement he will probably come out of his case and die, when you may dissect him at your leisure, and learn a great deal more about him thereby than (I am sorry to say) I know."

Brighton Anemones.—Of the *Actiniadæ* severa species are found on our coast, or are procured by dredging. *Anthea cereus* is here obtained of a green colour; its numerous tentacles, which are not retractile, are tipped with purple. It is, for an actinia, active in its habits, and very voracious. Of *Sagartia* we have six species, namely *S. troglodytes*, which is found on rocks between tide marks, frequently in the deserted holes bored by the pholas, *S. aurora* and *S. candida*; also *S. parasitica*, whose favourite place of abode is on the shell inhabited by the hermit crab, or on *Pecten maximus*; *S. bellis* and *Actinoloba dianthus*, formerly called *Sagartia dianthus*, which is generally considered the handsomest of the British species. *A. dianthus* is gregarious, being frequently found in considerable numbers in the coralline zone, or on scallop or oyster beds. It also frequents pools between tide marks. *Sagartia bellis* is also gregarious. Of this species there are six varieties. The genus *Bunodes* derives its name from its rough and warty skin. We have three species—namely, *B. Gemmacea*, *B. clavata*, and *B. crassicornis*, the largest of our sea anemones, and the most common of the genus. It is generally found near low-water mark. . . . . The species of *Actinia* most common on our coast is *A. mesembryanthemum*, which is abundant between tide marks. Six varieties, distinguished, as in the case of the other *Actiniadæ*, by their colour, have been found along our coast by Mr. Pike. *A. margaritifera* has also been found here, but is less common.—*Merrifield's Nat. Hist. of Brighton.*

Badger in Cornwall.—One day last month a fine badger was captured in Burnewhall cliffs, St. Buryan, Cornwall. I fear before very long they will become extinct in many parts of the country. I have not heard of one being met with in Cornwall till now for some years.—*H. Budge.*

Colias edusa in Reading.—On the morning of the 24th of last month I had the pleasure of seeing close to our town a dozen of the above insect, and of capturing one of them, a male. As Mr. Stainton in his "Manual of British Butterflies and Moths" does not give us Berkshire in his list of places where it has been met with, this new locality for the "clouded yellow" may be of interest to some of your many subscribers.—*Henry Moses, M.D., Bainton House, Reading.*

BOTANY.

Toad Flax.—There is a little insignificant plant, the Ivy-leaved Toad Flax (*Linaria cymbalaria*), which at this season of the year is well worth searching out for the sake of observing a curious habit, which it exhibits in regard to the preservation of its seed. It is common enough wherever there are rough stone walls or ruinous buildings; for although it is said to have been originally a native of Italy, it has found the climate and air of England so congenial that it has gradually spread over the whole country. One thing is certain, wherever it has chanced to establish itself it flourishes in the greatest luxuriance and ripens its seed abundantly. Now, as the wall or building on which it grows is usually perpendicular, and the plant, raised several feet above the ground, extends its flowers some two or three inches away from the wall, it seems at first sight almost impossible for the seed to be preserved. Stretched out at the end of a stiff wiry thread, it is nevertheless a necessity of its nature that it should germinate in the wall itself, not merely because that is its proper habitat, but if it dropped straight to the ground it would (like the seed in the parable) be trodden under foot or else be scorched up for lack of moisture. To preserve its progeny from so disastrous a fate, this humblest of flowering plants is endowed with a property which really seems analogous to the instinct of the animal. No sooner have the organs of fructification done their work and withered away, than the stalk, now supporting the seed capsule, begins to bend away from the light, very slowly and imperceptibly, but appreciably, if watched from day to day: gradually it twists completely round, and the seed vessel faces the wall. But this is not sufficient: the office of the pedicel is not accomplished until its precious burden is placed in safety. For this purpose it draws close to the face of the wall or building, and then actually seems to search out a rough chink or hollow, into which it may thrust the capsule, in order that the seeds may find a secure resting-place when separated from the parent plant. Similar instances of vegetable instinct—similar, that is, in principle, though not so striking in effect—may be seen in two other plants of a widely different nature. The cyclamen takes its name (Greek *Kuklos*, a circle) from the fact of the flower-stalk curling into a close spiral, in the midst of which the seed-vessel lies snug and safe under the shelter of the leaves, from whence by degrees it works its way into the soil. The African earth-nut (*Arachis hypogœa*), one of the papilionaceous plants, allied to our horse-shoe vetch and coronillas, is largely cultivated by the negroes for the sake of its pod, which is an important article of food, and is dug by them out of the earth, as its specific name implies (*Hypo ge*, under the soil). But how does the seed-pod thus become subterranean? The flower-stalks, when they have finished their duty of elevating the stamen and pistil to catch the life-giving rays of the sun, begin their second office of aiding the seed-vessel to mature by turning completely round and thrusting it into the ground, where it lies in a state of repose, until dug up by some hungry negro, or until its dormant vitality is called into action by the effects of the rainy season. —*W. W. S.*

Carpels of Geraniums.—I felt rather sorry that Mr. James Britten, in his paper on Cranesbills in the last July number of Science-Gossip (not June, as mentioned by Mrs. Watney), should not have pursued the matter a little farther, and have described the curious coiling up of the persistent stigmas attached to the carpels after detachment from the plant. I had long noticed this circumstance, and never, remembering it being alluded to by any botanical writer, thought it was known to all. However, as Mrs. Watney says in the August number, "And more than one botanical writer draws attention to the singular appendages," it appears the circumstance. The facts of the case are these: when the carpels become detached from the receptable, the awn, or persistent style, becomes convolute or spirally twisted for about half its length; on becoming detached and falling off, the portion of the style not convoluted is bent back at right angles to the portion convoluted; and now the wonder begins. The spiral awn is highly hygrometrical, and the carpels falling on the earth, the mechanical operation of *boring* commences, the seeds actually *worming or cork-screwing* themselves into the soil, after the manner of a gimlet, and the portion of the awn not convoluted (or spirally twisted) acting as a handle or lever!—*Thomas Williams, Bath Lodge, Ormskirk.*

Maiden Hair.—In Germany there is a legend attached to a well near which this fern (*Asplenium trichomanes*) grows most luxuriantly. A lady keeping tryst with her lover, he was suddenly, after the fashion of Germany in those days, transformed into a wolf. The lady fled before him, and in her haste fell over a precipice, her black hair tangling in the bushes as she descended. On the spot where she fell a clear spring welled up, and round about her hair took root. The well is called "The Wolf's Spring," and the little custodian of the glen, after telling you the story, hands you a bunch of the "Maiden's Hair."—*Chanter's "Ferny Combes."*

Veronica Buxbaumii.—I wish to record in Science-Gossip another station for *V. Buxbaumii*. I am not aware that it is known as a Cumberland plant. It is growing very luxuriantly by the road-side, in a place where some rubbish has been

thrown, in my parish of Westward. This species of Speedwell, though known only a few years ago to be British, is turning up in various and distant places. How it is dispersed it is difficult to say.—*R. W.*

MICROSCOPY.

Cynodon dactylon. — This grass, found in Cornwall, is very common in India. Powell states, in his "Handbook," that "the flowers of this plant present a most beautiful object, when examined by the microscope. . . . It is mentioned in the 'Atharvan Veda' as the plant with a hundred roots and a hundred stems."

Down of Wild-fowl.—We would recommend collectors, when taking the eggs of wild-fowl, to bring away with them some of the down from the nest, for we believe that when the birds are not seen, the colour and character of the down will suffice to indicate the species.—*Land and Water*, July 31st.

[We have urged the examination of the down of birds upon microscopists as affording a new and interesting field for research. This paragraph confirms us in the conviction that great variety will be found, and that the subject is well worthy of attention.—Ed. S.-G.]

Expanded Zoophytes. — I have employed the following method to kill the common zoophytes of our coast with their tentacles expanded:—I take a small saucer, such as sold at artists' colour shops, and place the zoophyte in it, covering it with sea-water, then float the saucer on the top of *fresh* water in a quart basin. When the zoophyte finds itself at rest, it protrudes and expands its tentacles. When I think they are fully expanded, I suddenly sink the saucer in the fresh water. The sudden immersion in an unkindly fluid kills the polypes before they have time to retract their tentacles. A little care is required to submerge the saucer instantaneously, and the result will be satisfactory. Of course they may then be mounted in a cell with glycerine in water.—*C.*

Battledore Scales of Butterflies.—An interesting paper on this subject, with figures of fifty-three scales, by Mr. John Watson, of Manchester, is published in the August number of the "Monthly Microscopical Journal."

The Ciliated Ceramium. — The *Ceramium ciliatum*, a thick tuft of which I obtained, is composed of many slender much-branched threads, each of which at the tip forms two hooks or curls looking towards each other, a feature which is more or less characteristic of the genus, and which here, where it is strongly marked, imparts a very singular and unmistakable aspect to the plant. The stems and branches are jointed at regular intervals, and every joint is quite clear and colourless in the central part, and purple at both extremities; add to this, that at each joint there is a circle of stiff glassy prickles, which stand out in a radiating manner; so that, on the whole, the species is one of the most pleasing objects one can find, especially when subjected to microscopical examination. — *Gosse's "Tenby."*

Adventure in a Diatom.—While examining some diatomaceæ one day in the course of last summer, I chanced to be favoured with a peep at a phenomenon of a most unusual and ludicrous description. It was one that, I presume, would have greatly delighted not a few of the gullible disciples of those credulous philosophers who, all regardless of facts, persist in treading reverently and blindly in the footsteps of the great Berlin naturalist, and claim for the diatomaceæ an animal nature. For this once, certainly, I was almost converted, and very reasonably too, for the circumstances furnished, at first sight, the most convincing argument conceivable. The gathering that supplied the above was composed chiefly of *Surirella gemma*. One specimen on the field of the microscope, to my amazement, contained *in its interior* an animalcule of the Euglena (Ehr.) genus. For a short time after the diatom came into view, the imprisoned Euglena was motionless, apparently bewildered, or overcome with the novelty of its position. Presently, however, "calling home its scattered senses," it began very slowly and deliberately to look about its chamber of imprisonment; now elongating and then contracting itself, in such a manner that if the poor diatom were possessed of animal sensibilities, strange indeed must have been its feelings. That the animalcule was within the diatom was evident from the fact that all the movements of the former were limited by the walls of the latter; and at the same time the changes of form and place of the Euglena were accompanied with and produced corresponding alterations of the endochrome of the diatom. The question that this incident started was, how did the animalcule reach the interior of the frustules, since its valves and cingulum (or walls) were apparently unbroken? Can it be, after all, notwithstanding what has been said to the contrary, that diatoms go in for special feasts, when they prefer to dine on more dainty and substantial fare than they are accustomed to partake of on ordinary occasions? Ay! that's the rub; how came it there, poor wretch? Thus, I think: when the drop of water which contained them was covered with the thin glass, the Euglena must have been under the diatom, and in contact with the surface of the slide. The diatom was, from some cause or other, minus one valve, that nearest the objective only remaining. This, with the connecting zone attached to it like a box-lid, confined the animalcule under and within it.—*B. Taylor, Whitehaven.*

NOTES AND QUERIES.

Oranges were known in this country in the time of Henry the Eighth, but I find no account of the orange-tree being cultivated in England prior to Queen Elizabeth's reign. The Seville orange-tree appears to have been first planted the year before the East India Company was incorporated, and two years previous to the return of Sir Francis Drake, our first circumnavigator. It is said to have been introduced by Sir Francis Carew, and first planted at his seat at Beddington, in Surrey.—*Phillips, "Fruits of Great Britain."*

Leaf Transformation.—As some of the readers of Science-Gossip are interested in the curious transformations we find in plants, I venture to send another specimen of an Indian Pink, where the principal stalk, instead of growing as it should do, has thrown out at the end a leaf on a long stalk, with the edges so united as to form a kind of tubular vessel, with a small opening at the upper end.—*E. T. S.*

Precocious Infants.—Along with the Cocoa-nut palm are great numbers of the Areca or Betel-nut palm, the nuts of which are sliced, dried, and ground into a paste, which is much used by the betel-chewing Malays and Papuans. All the little children (at Matabello), even such as can just run alone, carried between their lips a mass of the nasty-looking red paste, which is even more disgusting than to see them at the same age smoking cigars, which is very common even before they are weaned. —*Wallace's "Malay Archipelago."*

The Holly.—This tree appears to have been formerly called Hulver, by which name it is still known in Norfolk, and Holme in the southern counties, as appears by the name it has given to many places where it grows naturally, as the Holmwood, between Horsham and Dorking. Mr. Evelyn says that the vale near his house in Surrey was anciently called Holmesdale.—*Sylva Florifera.*

Mochras, or Phul supyari. — This kind of *Mochras*, which looks not unlike Sembal gum, is in reality not a gum at all, but a brown astringent gall-blister, that is found on the *Areca catechu* palm, called "saigata gond" in Gurgaon. In my own collection is a sample of this gum which I got at Sealkote, called "Mochras, or *phul supyari*" (flower of the areca), which last name, though "flower" is incorrect for a gall, yet indicates the origin. This is imported from Hindustan and Bengal, &c.; so that "Mochras" has three meanings:—1st, Sohajna gum; 2nd, Sembal gum; 3rd, Areca galls.—*B. Powell, "Handbook of Economic Products."*

[This has long been a disputed point in Europe. Will some one of our Indian correspondents collect themselves, and send us, a small sample of gum direct from the Red Sembal tree (*Salmalia Malabarica*)? It has been affirmed that this tree does *not* produce any gum: surely this could be proved. Further, we have examined pounds of the so-called "galls of areca" or *Mochras*, without a trace of insect remains being found. Are they *galls* at all? —Ed. S.-G.]

Sea-Bottom Chalk.—There can be no doubt whatever—indeed it is admitted by all microscopists—that chalk is now being formed in the depths of the Atlantic; but an idea which suggested itself to us before we proposed our cruise has now ripened into a conviction, that it is not only chalk which is being formed, but *the chalk*—the chalk of the cretaceous period.—*Prof. Wyville Thomson.*

Bleaching Zoophytes.—I have seen the skeletons of sertularian zoophytes mounted for the microscope, which are beautifully white and clean. Can any one inform me how it is done? I have tried the chloride of lime of the shops in solution, without satisfactory results.—*M. O. P.*

Crabs changing Colour.—The change of colour which takes place in many of the crustacea during the process of boiling has long been a subject of remark. The common and edible crabs of this country have their tints far less affected than the lobster, the peculiarly rich blue shade of whose shell when in a living state is too well known to need any lengthened description: this, as is well known, changes to a bright red in the cooking-pot, and the uniform of the *police* is exchanged for that of the *line regiments*. This strange metamorphosis researches have shown to be entirely dependent on chemical laws. The pigment on which the blue shading and tint depend is a peculiar fat-like substance, which possesses the singular property of becoming scarlet when subjected to seventy degrees of heat, as shown in the centigrade thermometer. A colouring matter of very similar properties was some time since discovered in the beaks and legs of certain birds. The lobster pigment is soluble in spirits of wine, by which agent it can be extracted from the shell; but the colour changes at once from blue to red; and on adding either nitric of sulphuric acid, the charged spirit is changed to a green of a remarkably *fast* or permanent character. —*W. B. Lord.*

Samlets.—Is it a fact that anglers are prohibited from taking "samlets;" and has it been proved, without doubt, that "samlets" are young salmon? I have my doubts on the subject, but of course, if proved, I must give in.—*W. J. Hill.*

Bees.—As a practical apiarian, I have much pleasure in answering the queries of your correspondents. J. L. Phelps need not be at all alarmed at the want of sticks in his hive; in my opinion they are much better dispensed with; the combs do not want the support, and if at any time the bees are "driven" for the purpose of removing the combs, they are difficult to be cut out. A swarm of mine lately took possession of an old hive furnished with combs, and having sticks pushed through; as I routed them out of it to transfer them to a "Woodbury Bar and Frame Hive," I had to remove the comb piece by piece to get at the queen, and found the sticks very seriously inconvenience me. Perhaps "J. L. P." is not aware that bees fill their honey-bags before swarming, and consequently require to be almost provoked before they will sting. Now for "F. S." The swarming into the small cape (cap?) must be apparent, not real; two queens never exist in the same hive. I would advise "F. S." to remove it in the same way that he takes his supers. Brood comb is not unfrequently made in "supers," and some apiarians use gradings three-sixteenths of an inch wide to exclude the queen and drones from the supers; this width will allow the workers to pass freely. Now let me put a query before your readers. I keep the Ligurian, or Italian Alp Bee (*A. ligustica*); one of my queens, this year, has been impregnated

by a black drone, consequently the stock she is at the head of is hybridized. Other apiarians have met with the same difficulty, and several plans have been suggested for keeping the Ligurians pure. Now is it not a remarkable circumstance that two distinct species should thus be liable to cross? Why should not the different species of wasps cross in like manner? Is it probable the hybrid drones would be able to fertilize a queen?—*D. D. B., Cantab.*

At Hastings.—In the spring, *Doris bilineata* comes to the rocks in thousands, to lay its strange white furbelows of spawn upon their overhanging edges. Eolides of extraordinary beauty haunt the same spots:—the great *Eolis papillosa*, of a delicate French grey; *E. pellucida* (?), in which each papilla on the back is beautifully coloured with a streak of pink, and tipped with iron blue; and a most fantastical yellow little creature, so covered with plumes and tentacles that the body is invisible, which I believe to be the *Idalia aspersa* of Alder and Hancock. At the bottom of the rock-pools behind St. Leonard's Baths may be found hundreds of the Snipe's Feather Anemone (*Sagartia troglodytes*) of every hue, from the common brown and grey snipe's feather kind to the white-horned Hesperus, the orange-horned Aurora, and a rich lilac and crimson variety, which does not seem to agree with either the *Lilacina* or *Rubecunda* of Gosse. A more beautiful living bouquet could hardly be seen than might be made of the varieties of this single species from this one place.—*Rev. C. Kingsley's "Glaucus."*

Blood Corpuscles.—That the colourless and red corpuscles of human blood are in some way, and that intimately, connected, as conjectured by your correspondent Mr. E. T, Scott, there is very little cause to doubt. In making this assertion I am supported by one of the highest physiological authorities. It is believed that the process is in some way as follows:—viz., the red corpuscles, which are supposed to be only the liberated nucleus of the colourless, are so acted on by a red fluid which they contain as to change their hue; at maturity the sac, or outer envelope, of the colourless corpuscles bursts, allowing their egress. If I may be pardoned for expressing my opinion, it is that the red corpuscles exist in greater abundance in the warmest system, if healthy. A warm and healthy constitution is one in which the superincumbent heat of the body is given off in the shape of perspiration from the skin. The complexion of a person who is capable of enduring much warmth, without the system relieving itself in this way, is seldom of so ruddy a hue as that of one in a different condition. This must be attributed to the effect of carbonic acid. Without going further into the subject, I shall end with the query—If the presence of this ingredient can cause a diminution of the red tint in the skin, which below the epidermical tissue we know to depend on the smaller blood capillaries for its colouring matter, why not attribute to it the preponderance of colourless corpuscles in the blood of a body most charged with it?—*W. W. S. Beaufort, Clifton Read, South Norwood.*

Flora of Bucks.—We are happy to learn that our worthy correspondent Mr. James Britten has secured an appointment, so congenial to his tastes, at the National Herbarium, Kew Gardens. All communications relative to the Flora of Bucks, or local names, should be addressed to him there.

Age of Fish.—There does not seem to be any guide for ascertaining the age of a large fish; but in Mr. Rooper's "Autobiography of Salmo Salar in Flood, Field, and Forest," we find, speaking of a large salmon, "I consider him to have been fully seven years old, reckoning *ab ovo*;" thus, egg deposited December 1861; hatched February or March 1862; went to sea as a smolt, May 1864; returned a six-pound grilse, June 1865; went to sea in April 1866; returned a twelve-pound salmon, September same year; went to sea in April 1867; returned a twenty-pound salmon September 1867; went to sea in May 1868, and was captured as a thirty-pound salmon in October of the same year.

Scales of Holm Oak.—The stellate scales from the leaves of the common Evergreen, or Holm Oak (*Quercus ilex*), are beautiful microscopic objects, and especially so when viewed by polarized light on a green and purple selenite stage. The tree itself is common in parks and gardens, and is a native of South Europe. It was introduced into England in 1581. I shall be pleased to forward a specimen leaf to any reader of Science-Gossip on receipt of stamped envelope.—*R. H. Moore*, 18, *Albert Buildings, Bath.*

Flight of Birds.—I should feel greatly obliged to any of your readers who would kindly supply me with reliable information as to the velocity of flight in birds, or point out whence such information is to be obtained.—*T. Southwell, Park Lane, Norwich.*

Science-Gossip Society.—Under this title a society has been started in Ipswich "for the purpose of exciting more interest in the study of Geology, Botany, Chemistry, Natural Science in General, and Archæology." Rules are drawn up and printed, a committee of officers appointed, and all promises well. The venture has our best wishes.

Cats in the Water.—I have seen a cat eat a frog that it had just caught; it pulled off a limb at a time, after killing the animal with all the usual barbarities. That cats will take the water is also on record; there was a cat, or rather a family of cats, if I remember aright, at the "Complete Anglers," Marlow, that used to swim after the dead fish thrown out of the punt wells by the fishermen. This could no doubt be corroborated.—*C. C. C.*

Cats and Starfish.—Is there any violent antipathy between cats and starfishes? It is a common belief about here that a "five-finger" laid out in the garden will effectually scare away all stray cats, and I have known them often to be procured for that purpose. Opinions are divided as to the way in which it acts, some saying that the cats eat the starfish, and are poisoned by it; others, that they are frightened away by its mere presence. I tried it myself, and found the bait carried away, but am not aware that the required effect was produced. —*Wm. Field.*

Dr. Thudichum's Rabbit.—In the August number of Science-Gossip, wherein appeared my article on this subject, I discovered that I had stated that 58,000 Trichini were computed in the fifth part of a grain, which should have been 58 only, as the next sentence would lead the reader to conclude; but, worse still, the length of the vermicule is stated in figures as the $\frac{1}{1166}$ hundred thousandths of a line, whereas it should be the 1,166 hundred thousandths of a line.—*J. Crowther.*

Bacillaria paradoxa.—My query in March number respecting the habitat of this singular diatom, in which I doubted it as an exclusive marine and brackish genus, has elicited an answer from India, in your June number, from Major Hobson, from which it now appears conclusive that it is also a fresh-water genus. Since then I have been somewhat diligent in searching after its fresh-water localities in and around the metropolis, and the following can be recorded:—River Lea at Edmonton, about twelve miles from the River Thames; Regent's Canal, Regent's Park, about seven miles from the river; Surrey Canal at Camberwell, about four miles from the river; the Surrey Commercial Docks, in the timber ponds; and the Victoria Docks. Perhaps the last two localities may at times be slightly brackish, especially the latter; the remainder are in connection with the river, but at a distance where the water is quite fresh. At present, I, and a few friends interested with me, have failed to find it in water which is not in connection with a tidal river; nor have I heard of any one who has, except Major Hobson. I may add that I have kept these algæ alive in fresh water for a week or so. Respecting the extraordinary "military" movements of this fastest mover of all the Diatomaceæ, I cannot but believe that it must be caused, in common with all Diatoms, by the influence of light effecting forces within the frustule, in connection with growth, of which we know but little, remaining one of those mysteries of nature which baffle whilst exciting inquiry.—*Thomas Simson, Upper Lewisham Road, S.E.*

Food for Bullfinch.—Will you be kind enough to tell me the proper food for Bullfinches? If I give them hemp-seed I find they get too fat and die suddenly, and if I only give them rape and canary seed, they look bad and ragged in their feathers. I have two nice cock birds, but looking rather ragged and bare.—*L. C. Whelan.*

Value of Sparrows.—A few years ago the streets of New York and Brooklyn were infested with bugs and worms that riddled all the vegetation, hung in great festoons from the trees, swung in the air on every side, drove the whole population from what was once the cool and comfortable shade, making the sunny side of the street the refuge of the pedestrian, and the parks no longer pleasure resorts, but nuisances. People were always dodging these pests in walking; in the cars they picked them from each other's bonnets, in church from each other's backs. It was like a plague of Egypt, and people cried out for a Moses. The little European house sparrow undertook that *rôle*, and was successively introduced into the parks and open spaces, and everywhere its enemy and ours vanished before it. The difference in enjoyment between a summer in New York now and three years ago is very great, which difference of comfort must be laid to the account of our faithful little ally. Sparrows are now seen in this country by the thousand, and not only are they scavengers of cities and keepers of parks—not only do they make streets habitable and shade trees grateful, but they are worth their weight in gold to fruit-growers in the country round about. The only sufferers, indeed, by their domestication here are the comic papers, which used to be full of woodcuts describing the old discomforts—Adolphus making love to Angelina with a pair of the banished enemies hanging to the waxed ends of his moustache, she wearing a cluster of them *en chignon*, and so on. All that resource is closed now for the humorous artists. But to the original question—Are we ungrateful to our feathered friends? Not so, as one who walks through Central Park will see, observing the palaces we have built for them, or who ever glances of a morning at their original settlement in Union Park—the Jamestown, so to speak, of these little colonists—and notes the hotels we have provided for our winged allies, while a steady old policeman is posted as faithful guardian of their rights and interests below.—*New York Times.*

On the Alcoholic Compound termed Punch. — Chastened and invigorated by the discipline of physical research, the philosopher fearlessly climbs the never-trodden peaks of pure thought, whence he surveys without dizziness the shadowy domain which lies beyond the horizon of ordinary observation. The empirical art of punch-brewing is coextensive with civilization. But the molecular commotion which agitates the palate of the punch-drinker and awakes in his brain an indescribable feeling of satisfaction could only be apprehended by one whose mind had been previously exercised on the parallel bars of acoustics and optics. Taste is due to vibratory motion. A pepperment lozenge, for example, dissolving in the mouth, may be likened to a vast collection of minute tuning-forks vibrating synchronously. Pulses are imparted to the nervous filaments of the tongue and palate, and are translated by the internal sense into peppermint. What was molecular agitation is now taste. With punch properly compounded, we obtain saporous vibrations of various degrees of rapidity, but so related that their simultaneous action on the organ of taste produces an agreeable harmony. The saccharine, acid, and ethylic trills are rhythmical, and a glass of punch is truly the analogue of the sonnet. The instinct of man has detected many such harmonies which have yet to be investigated. For example: what palate is insensible to the harmonious effect of roast hare and currant-jelly? But where is the philosopher who can lay his hand upon his heart and say he has determined the relation of the saporous vibrations of the jelly to those of the hare? My own researches on this point have deepened my natural humility, and I now eat my currant-jelly with the simple faith of a little child. Experiment has proved that the juice of three or four lemons, and three-quarters of a pound of loaf-sugar dissolved in about three pints of boiling water, give saporous waves which strike the palate at such intervals that the thrilling acidity of the lemon-juice and the cloying sweetness of the sugar are no longer distinguishable. We have, in fact, a harmony of saporific notes. The pitch, however, is too low, and to heighten it, we infuse in the boiling water the fragrant yellow rind of one lemon. Here we might pause, if the soul of man craved no higher result than lemonade. But to attain the culminating saporosity of punch, we must dash into the bowl, at least, a pint of rum and nearly the same volume of brandy. The molecules of alcohol, sugar, and citric acid collide, and an entirely new series of vibrations are produced—tremors to which the dullest palate is attuned. In punch, then, we have rhythm within rhythm, and all that philosophy can do is to take kindly to its subtle harmonies. It will depend in some measure upon previous habits, whether the punch when mixed will be taken in excess or in moderation. It may become a dangerous ally of gravity and bring a sentient being to the gutter. But, on the other hand, it may become the potent inner stimulus of a noble outward life.—*Exeter Change for the British Lions.*

NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal, should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We do not undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus: × 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals, should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. ADDRESS No. 192, PICCADILLY, LONDON, W.

NAME AND ADDRESS.—Communications not guaranteed by the name and address of the sender cannot be noticed.

R.—The figures are too roughly executed to be engraved, and the information no more than we have already given.

A. P.—We do not insert exchanges of scientific instruments.

G. H. R.—A fungus not uncommon in such situations, named *Polyporus igniarius*.

W. C.—Most probably *Rhodites Eglanteriæ*, Hart; but we found no insects.

H. L. M.—It is a parasite on the heather and other plants, called "Dodder" (*Cuscuta Europæa*).

J. S.—Consult "Blackwall's Spiders of Great Britain," published by the Ray Society.

G. E. Q.—The name of the gnat stands corrected to *Culex nemorosus*.—*C. W.*

W. G., Belfast.—The aphis was probably *Adelges corticalis*, or *A. abietis*.—*C. W.*

T. V. P.—Address, but no name: hence we could not write. It is of no use on such questions giving a mere negative or affirmative here.

E. C.—The spiders (male and female) are small darkly coloured examples of *Linyphia minuta*, Black.—*O. P. C.*

R. V. T.—No. 1 is *Chara fragilis*, Des.; 2 is *Ranunculus heterophyllus*, Fr.—*B.*

D. S. H.—It is not extraordinary for some barren fronds of the "parsley fern" to resemble the fertile fronds in their upper portions. Sometimes soti are also produced on parts of otherwise barren fronds.

S. A. S.—On hawthorn leaves is *Septoria oxyacanthæ*, Kunze.

E. L.—Although broken in transit, from the fragments we should think *not*.

W. J. H.—The "cingulum," an accessory to the reproductive apparatus. See E. Ray Lankester's exhaustive papers on the "Anatomy of the Earthworm," *Quart. Journal of Microscopical Science*, 1864-5.

R. W. V.—It is best to poison the plants with a solution of corrosive sublimate in spirits of wine. Camphor *may* keep insects away, but will not kill them. It is a good plan to use a coarse strong-smelling brown paper for covers, and to air the plants by turning them over, and looking at them every two or three months. A herbarium in constant use, and kept in a very dry place, seldom suffers from mould or insects.

G. E.—We inserted your long notice last month, quite contrary to practice, and cannot do it again. *Three* lines is our "exchange" limit. Some people, it seems, cannot afford to keep a conscience.

A. Y.—White flowered specimens of *Erythræa centaurium* are certainly not uncommon.

H. G.—It is such a very common occurrence for *Vorticella nebulifera* to be attached to *Daphnia* or *Cyclops* that we wonder you should have never met with it before. There are figures extant in such a position in a book before us dated 1746.

H. W.—Very like a "hallucination."

A. E. J.—Galls caused by an insect. See our constantly repeated notices about name and address.

C. F. G.—The two insects are—*Chrysis ignita* (blue and copper) and *Megachile centuncularis*.—*C. O. W.*

B. R. A. E.—The plant sent is *Saxifraga aizoides*.

E. C.—The flowers are *Calluna*, are quite normal, but not fully developed. We cannot tell what has checked the full expansion of the flowers.—*M. T. M.*

EXCHANGES.

ALPINE PLANTS for rare British Roses and Mosses.—J. H., Garrybank, West Hill, Upper Sydenham.

MOUNTED DIATOMS from American Deposits (Monmouth, Cherryfield; Duck Pond; French's Pond; Sing-sing, Hudson's River; Perley's Meadow; South Bridgton, &c.) for good Entomological Slides or Wood Sections.—"Portland," care of Editor of SCIENCE-GOSSIP, 192, Piccadilly.

PAULOWNIA IMPERIALIS.—For Seeds, send stamped and directed envelope to "Oporto," Editor of SCIENCE-GOSSIP, 192, Piccadilly, W.

SOUTH AMERICAN EGGS in exchange for British, also British for other British.—F. W. Marratt, 6, Kemble Street, Kensington.

BRITISH PLANTS (dried) in exchange for others.—Send lists to J. C. Hutchinson, 8, Lansdown Crescent, Glasgow.

UNIO MARGARITIFER for other Land and Fresh-water Shells, or British Lepidoptera.—John Stewart, 28, St. John Street, Perth, N.B.

FERNS, as last month, and sixteen others.—George Edey, Rochester.

FIFTY ENTOMOLOGICAL and other slides for Palates of Mollusca or Zoophytes, mounted or unmounted.—J. O. Harper, Dereham Road, Norwich.

BETONY BRAND.—Send stamped envelope to J. Maughan, Bank, Barnard Castle.

BOOKS RECEIVED.

"The Canadian Entomologist." Vol. I. No. 12. July, 1869. Toronto.

"Land and Water." Nos. 184, 185, 186.

"Scientific Opinion." Part IX. August, 1869. London Wyman & Sons.

"The Gardener's Magazine." Part XLIV. August, 1869.

"Le Naturaliste Canadien." No. 8. July, 1869. Quebec: 8, Rue de la Montagne.

"The 5, Bow Churchyard, Magazine." Nos. 3 and 4. May and August, 1869.

"The Monthly Microscopical Journal." No. 8, August, 1869. London: Robert Hardwicke.

"The American Entomologist." No. 8. April, 1869. St. Louis, Mo.: R. P. Studley & Co.

"First Annual Report of the Trustees of the Peabody Academy of Science." January, 1869. Salem: Mass., U.S.

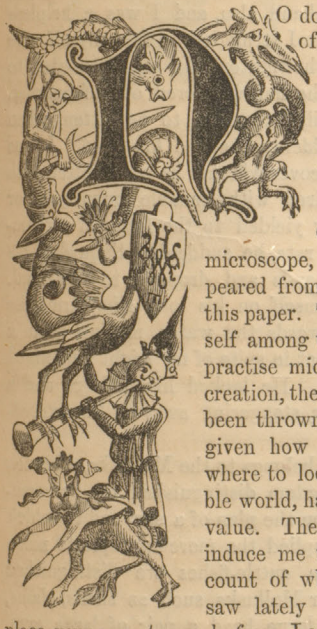
"Dental Register." Vol. XXIII. No. 8. August, 1869. Cincinnati: Wrightson & Co.

"Despotism," by the Author of "Vital Life." London: Longmans.

"Sixth Annual Report of the Belfast Naturalists' Field Club." 1868-9.

COMMUNICATIONS RECEIVED.—J. G.—T. D. R.—C. H. J.—B. G.—G. E.—H.—E. C.—O. P. C.—J. B.—B. T.—A. P.—H. E. W.—J. H.—T. S.—T. H.—T. W.—T. W. W.—W. W. S. B.—C. (Dublin).—A. T.—A. M. F.—G. H. H.—R. H. N. B.—J. G. O.—R. A.—J. P.—W. N. R.—J. W.—W. C.—H. L. M.—H. B.—H. M.—W. S. G.—F. K.—A. J. (Thanks).—A. H.—W. J. H.—R. W.—F. W. M.—J. C. H.—J. R.—B.—C. F. G.—E. C.—D. S. H.—H. B.—E. H. J.—C. B.—R. H. M.—C. C. C.—R. W. V.—W. F.—T. H.—J. O. H.—A. Y.—J. M.—T. S.—J. G., jun.—H. W.—G. E.—H. G.—C. F.—L. C. W.—J. C.—G. B.—J. S.—W. H.—A. E. J.—R. G. McL.—B. R. A. E.—J.—E. M. J.—J. P. F.—H. E. W.—J. J. M.—C. W.—R. S.—S. M.—B. C.—W. W.—M. A. G.—R. W.—S. J. S.—L. N. S.—E. L.

WITH THE MICROSCOPE AT SOUTHEND.



No doubt many readers of Science-Gossip have often been delighted to read descriptions of particularly successful expeditions to gather objects for the microscope, which have appeared from time to time in this paper. To many, and myself among the number, who practise microscopy as a recreation, the hints which have been thrown out, the advice given how to proceed and where to look for the invisible world, have been of great value. These considerations induce me to give some account of what I found and saw lately at Southend, a place very easy to reach from London, and where many objects of great beauty and interest can be gathered with ease and certainty.

Special preparations are not requisite; a number of wide-mouthed bottles, a muslin net and a spoon, in lieu of which one of the mussel-shells may be used with advantage, are all that are required. One thing, however, is indispensable, and that is the microscope itself, as some of the most lovely objects cannot be kept longer than a few hours.

The chief characteristic of Southend is that the tide runs out more than a mile, and leaves the muddy bottom of the sea exposed to view for several hours, and the pier has in consequence a length of a mile and a quarter. This feature certainly does not add to the beauty of the place as a bathing-place, but offers great advantages to the collector of objects. When the sun shines on the numerous little pools and cavities, he draws the diatoms to the surface of the water left in them, and when on a quiet day the tide comes slowly creeping up, it forms a yellowish-looking froth, which is carried to near high-water mark. If this froth is put into a bottle by means of a spoon, and examined, it will be found to contain about twenty different kinds of diatoms, among which three or four *Pleurosigma*, a number of *Navicula*, and sometimes *Triceratium*. The last named I did not find myself, but know from good authority that it is met with.

If the tide is near its maximum height, the yellowish froth disappears through the breaking of the waves against the stones, and is replaced by whitish foam, which does not contain any diatoms. Nearly all these diatoms are alive, and their peculiar jerking movements can be examined at leisure.

Next, if we take a rowing boat when the tide is up, and pick up by means of a net or a stick the stray bits of the finer seaweeds swimming about, we find again diatoms and many beautifully branched vorticellidæ; but by far the finest objects are obtained in the following manner: two flights of stairs lead down from the pier to the bottom, one about at one-third of its length from shore, the second at about two-thirds. At low tide we can walk under the pier without inconvenience, and two large flagstones will be found at the bottom of each of the stairs, which in former times served as a rest for them. In these stones are cavities of the size of a washing-basin, and they contain a miniature forest of the most lovely little zoophytes and polypes. Some of them must be carefully cut out and transferred to the bottle with some sea-water. In other holes we may find similar growth attached to little stones, which can be dropped into the bottle without disturbing them. These must be carried home without shaking, and they furnish, on examination, for some hours a sight which defies description. When a small tree is placed in a cell as carefully as possible, we see at each end of a branch a transparent cup-shaped vessel, from which presently a number of hydra-like animals protrude,

L

with from six to twenty arms, which arrange themselves like a star-flower: through the stem we see the circulation of the sap or blood, or whatever it may be, which curiously enough sometimes runs from the flower to the stem, and sometimes *vice versâ*. Often the branches are covered with diatoms of various sorts, attached end to end, which give it a lovely appearance. Vorticellidæ with ciliary motion cause small circular currents, and little shrimp-like animals dash across, and give additional life to the picture. With a good one-inch object-glass, and with the spotted lens, we may obtain a sight the beauty of which I have rarely seen surpassed.

The stems of the polypes with the diatoms *in situ* are easily prepared as permanent objects, and are a desirable addition to the cabinet. C. B.

A CHAPTER ON CUTTLE-FISHES.*

By Lucie L. Hartt.

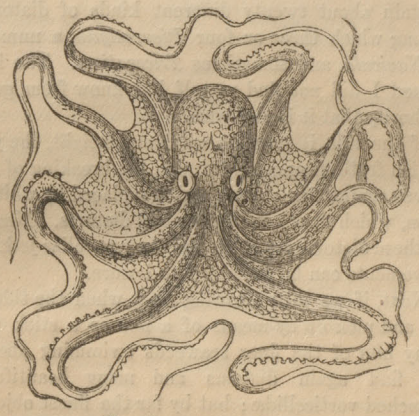


Fig. 167. *Octopus vulgaris.*

It was during my first visit to Brazil that one day, while busily engaged in examining a reef at a little town on the coast, called Guarapary, my eye fell on an object in a shallow tide-pool, packed away in the crevice of the reef, which excited my curiosity. I could see nothing but a pair of very bright eyes; but concluding that the eyes had an owner, I determined very rashly to secure him. I had been handling corals, and seemed to have forgotten that all the inhabitants of the sea are not harmless. I put my hand down very quietly, so as not to ruffle the water, when suddenly, to my surprise, it was seized with a pressure far too ardent to be agreeable, and I was held fast. I tugged hard to get away; but this uncivil individual, whoever he was, evidently had as strong a hold on the rocks as he had on my hand, and was not easily to be persuaded to let go of either. At last, however, he became convinced that he must choose between us, and so let go his hold upon the rocks, and I found clinging to my right hand, by his long arms, a large octopod cuttle-fish, resembling the one figured at the head of this article, and I began to suspect that I had caught a Tartar. His long arms were wound around my hand, and these arms, by the way, were covered with rows of suckers, somewhat like those with which boys lift stones, and escape from them was almost impossible. I knew that this fellow's sucking propensities were not his worst ones, for these cuttle-fishes are furnished with sharp jaws, and they know how to use them too, so I attempted to get rid of him. But the rascal, disengaging one slimy arm, wound it about my left hand also, and I was a helpless prisoner. In vain I struggled to free myself,—he only clasped me the tighter. In vain I shouted to my companion,—he had wandered out of hearing. I was momentarily expecting to be bitten, when the "*bicho*" suddenly changed his mind. I was never able to discover whether he was smitten with remorse and retired with amiable intentions, or whether he only yielded to the force of circumstances. At any rate, he suddenly relinquished his hold upon my hands and dropped to the sand. Then, raising himself on his long slimy arms, he stalked away towards the water, making such a comical figure that in spite of my fright I indulged in a hearty laugh. He looked like a huge and a very tipsy spider, staggering away on his exceedingly long legs.

The cuttle-fish belongs to the Mollusks, a branch of the animal kingdom distinguished for its members being built on the plan of a sac, and to which Mr. Hyatt has applied the more appropriate name of *Saccata*. The cuttle-fishes are distinguished from all the other Mollusks, such as snails, clams, &c., by having a large head, a pair of large eyes, and a mouth furnished with a pair of jaws, around which are arranged in a circle eight or ten arms furnished with suckers.

In the common cuttle-fish or squid of our coast, the body, which is long and narrow, is wrapped in a muscular cloak or mantle, like a bag fitting tightly to the back, but loose in front. It is closed up to the neck, where it is open like a loosely-fitting overcoat, buttoned up to the throat. Attached to its throat, by the middle, is a short tube, open at both ends. This tube, or siphon as it is called, is fastened to its throat, and can be moved about in any direction.

The animal breathes by means of gills, which are attached to the front of the body inside the cloak, and look like the ruffles of a shirt-bosom. By means of these gills the air contained in the water is breathed, and they answer the same purpose for the cuttle-fish that our lungs do for us.

* The woodcuts illustrating this paper are from Figuier's "Ocean World," kindly lent by the publishers, Messrs. Chapman & Hall.

In order to swim, the animal swells out the cloak in front, so that the water flows in between it and the body. Then it closes the cloak tightly about the neck, so that the only way the water can get out is through the siphon. Then it contracts very forcibly its coat, which, it must be remembered, is a part of the animal, and the water is driven out in a jet from the siphon under the throat, and the body is propelled in the opposite direction; that is, backward, like a rocket through the water. This

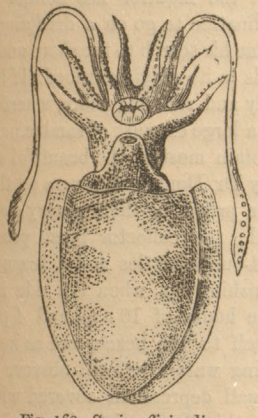


Fig. 168. *Sepia officinalis.*



Fig. 169. Internal bone of *Sepia.*

siphon is flexible like a water-hose, and can be bent so as to direct the stream not only forward, but sideways and backward, so that the animal can move in almost any direction, or turn somersaults with perfect ease; and so rapidly do some cuttle-fishes swim, that they are able to make long leaps out of the water. Usually, however, the animal swims backward, with its long arms trailing behind. Our common cuttle-fish of this coast has, in addition to its eight arms, two long slender tentacles, which may be withdrawn into the body. The tail is pointed, and furnished with a fin on each side.

The Octopods, to which the Brazilian cuttle-fish belongs, have round purse-like bodies, and eight arms united at the base with a web, and they swim by opening and shutting their arms like an umbrella; in this mode of swimming they resemble the elly-fishes.

The paper nautilus is nothing in the world but a female cuttle-fish that builds a shell. There was a very pretty story told of her habits, by Aristotle, the old Greek naturalist, which every one believed until quite lately. He said that she rode on the top of the waves, seated in her boat-like shell, and spreading her broad arms to the winds for sails. But unfortunately the story has no foundation in fact. She either crawls about on the bottom of the sea, or swims quite like any other cuttle-fish, shell foremost, only occasionally coming to the surface. Strangely enough, she holds the two broad hand-like

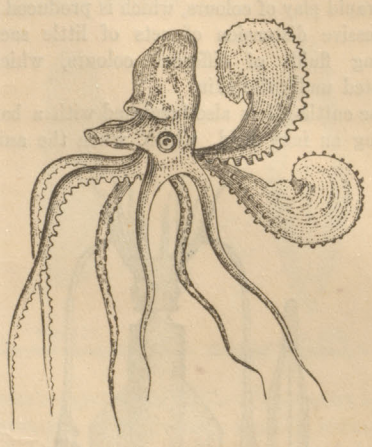


Fig. 170. Animal of *Argonauta Argo.*

extremities of the arms against her body, and it is the inside of these arms that secrete the paper-like shell, which is only a sort of cradle for her eggs. Not so with the pearly nautilus, which is furnished with a beautiful coiled-up pearly shell, formed on the outside of the animal. This shell is divided

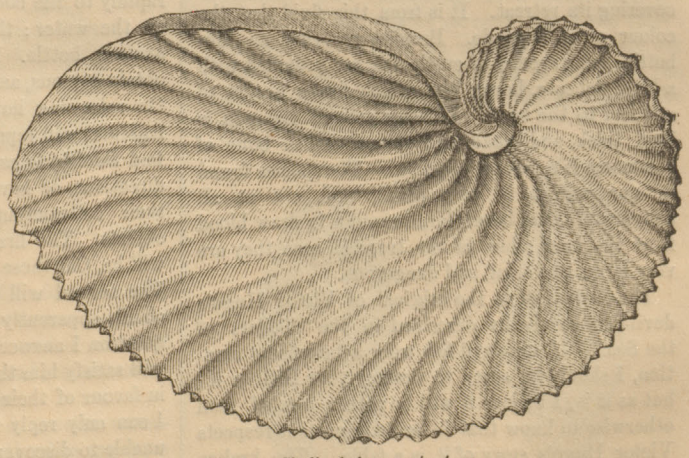


Fig. 171. Shell of *Argonauta Argo.*

into numerous chambers, and the animal living in the outer one builds a partition across the back part of it as the shell grows.

Cuttle-fishes are sometimes used for food by the Brazilians, and different species may be seen in the markets, where one frequently finds them still alive. Sometimes, as we stoop to examine one, its

body is suddenly suffused with a deep pinkish glow. Before we have time to recover from our surprise this colour fades, and a beautiful blue takes its place as rapidly as a blush sometimes suffuses a delicate cheek. The blue, perhaps, is succeeded by a green, and then the whole body becomes pink again. One can hardly conceive anything more beautiful than this rapid play of colours, which is produced by the successive distension of sets of little sacs containing fluids of different colours, which are situated under the skin.

The cuttle-fish is also furnished with a bag containing an inky fluid, which, when the animal is

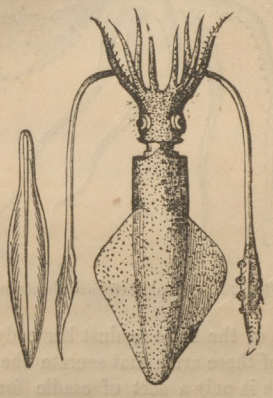


Fig. 172. *Loligo vulgaris*, with its feather.

attacked or pursued, it ejects into the water; thus completely blinding its adversary and effectually covering its retreat. It is from this fluid that the colour *sepia* is made. Besides carrying an ink-bottle, some species of cuttle-fish are provided with a long, delicate, horny pen, which forms a sort of stiffener to the back. In some species the pen is hard, thick, and broad, and the cuttle-fish bone of commerce is a pen of this kind. The species found in our waters is very small, and not at all dangerous, being barely large enough to draw blood from the hand; but in the tropical seas they are very large, powerful, and dangerous.

The cuttle-fish is the original of Victor Hugo's devil-fish, so vividly described in the "Toilers of the Sea." If the devil-fish were a beneficent creation, I should be sorry to destroy your faith in it; but as it is, I believe it will be rather a relief than otherwise to know that in some important respects Victor Hugo's story of it is a fable. The kraken was a mythical cuttle-fish of fabulous size.—*The American Naturalist.*

Death's Head.—There is every prospect of the "Death's Head Moth" being very plentiful next year. Several of the "caterpillars" have been caught in this locality. I have two in my possession.—*Joseph Robinson, Chester-le-Street.*

SEASIDE DIATOMS.

Amongst the "common objects" of the sea-shore, Diatomaceæ are perhaps the most frequent, and the tyro in microscopic studies generally desires to add a few of these beautifu forms to his cabinet of slides. I am often asked, How am I to procure them? and when obtained, How shall I prepare them? I propose, with the editor's permission, to answer both these queries; first premising that the inquirer has neither the opportunity nor inclination to go on a dredging expedition, but to confine his search to the shore and the brackish water-ponds in its neighbourhood. If he is residing near a sandy and shelving shore, where the receding tide leaves a large expanse of sand exposed, he will be able to obtain most of the beautiful sand species described by Dr. Donkin in papers on those forms. His plan for procuring them is very simple and very successful: the collector must provide himself with a few 4-ounce bottles and a teaspoon, and on the first sunshiny day, when the tide is at the ebb, between the hours of 10 a.m. and 4 p.m., he will betake himself to the beach, and as he approaches the receding waters he will observe the sand-ripples and small depressions covered with a yellowish-green film: this film consists almost wholly of diatoms. Having previously partly filled one of his bottles with sea-water at the nearest tide-pool, he must carefully remove the film with the spoon, and place it in the bottle; shake it violently three or four times, and he will observe the sand fall rapidly to the bottom, leaving the diatoms floating on the water: these he must quickly decant into another bottle. By repeating this process he will obtain copious, and frequently very clean gatherings. On returning home, an examination of the living frustules will repay the observer. He will probably find *Bacillaria cursoria* crossing the field in various directions, or have a Navicula sailing slowly about their cell-contents rendering them conspicuous objects. The first thought of the young observer will be, Can these active little bodies be only plants? The second will be, By what means do they sail about, apparently in search of food? To the first question I answer that a further study of plant-life will satisfy him that the balance of probabilities is in favour of their vegetable nature. To the second I can only reply that our most acute observers are unable to discover any organs of locomotion.

We will now suppose our tyro has finished his observations of the living frustule, and is desirous of seeing the beautiful markings on the flinty shells of these mysterious organisms. In order to do so successfully, it is necessary to get rid of the internal colouring matter (endochrome), and to separate the two valves. All diatoms consist of two similar (with few exceptions) silicious plates connected by a less firmly silicious band: a pill-box, in which the

bottom has been replaced by a second lid, roughly illustrates the perfect diatomaceous frustule: the lids represent the valves, and the body of the box the connecting band or cingulum. To get rid of the endochrome, and to effect the separation of the valves, it is necessary to boil the gathering in nitric acid: this will also destroy any vegetable or animal matter mixed with the gathering. After boiling in acid, the diatoms must be allowed to subside, and the acid poured off, and replaced with distilled water. It is highly important that all trace of acid be washed away, particularly when the forms are too delicate for balsam-mounting.

It sometimes happens that in spite of careful washing the diatoms have a tendency to form little clusters, and cannot be evenly distributed on the slide. This may be prevented by pouring off the water, and replacing it with *liquor ammoniæ*. If the diatoms are allowed to remain in this a short time (shaking the bottle or test-tube occasionally), a quantity of flocculent matter will be held in suspension, and may be poured off with the *liquor ammoniæ*, allowing a longer or shorter time, according to size, for the subsidence of the diatoms.

Our tyro, having cleaned and mounted his gathering, will probably be desirous of knowing the names of the forms occurring in it. I hope to enable him to do so by the aid of the following figures and descriptions of those species most commonly found in the before-mentioned localities:—

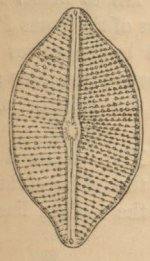


Fig. 173. *Navicula granulata*, × 400.



Fig. 174. *Navicula humerosa*, × 400.

Navicula granulata (fig. 173).—This form is readily distinguished by its lines of conspicuous and brilliant dots, reaching the median line and central nodule,* straight or slightly rounded sides and pointed ends: it always occurs in sand-gatherings.

Navicula humerosa (fig. 174).—A species resembling the preceding in outline, but the dots are apparently replaced by slightly radiating lines: these lines will, however, be found to consist of small dots placed close together: common with the preceding; it sometimes occurs with the sides slightly concave.

Navicula rectangulata (fig. 175).—A small, narrow form, with straight sides and rounded ends: the markings are radiant, distinct, and not resolvable into dots; gradually shortening as they approach the central nodule, leaving a small oval blank space in the centre of the valve.



Fig. 175. *Navicula rectangulata*, × 400.

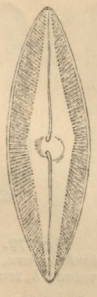


Fig. 176. *Navicula angulosa*, × 400.

Navicula angulosa (fig. 176).—This species is of an oval form, the sides gradually tapering towards the pointed ends; the markings reach about halfway towards the median line; thus leaving a central blank space, similiar in outline to the valve itself.

Navicula Lyra (fig. 177).—This species is very variable in outline; sometimes it is a true oval, at others the sides are straight, with the ends drawn out, and blunt. Another variety has the sides straight and tapering suddenly to the pointed extremities. This species has been named from the lyre-shaped blank spaces on each half of the valve: these are also subject to variation; the ends are sometimes curved inward instead of outward; the markings consist of closely-set dots, appearing like lines under a low power.

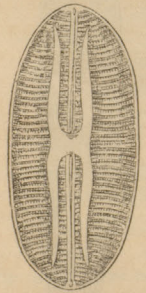


Fig. 177. *Navicula Lyra*, × 400.

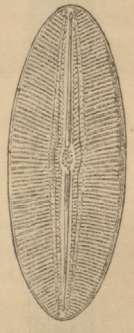


Fig. 178. *Navicula æstiva*, × 400.

Navicula æstiva (fig. 178).—A very pretty little species, of an oval form and pale straw-colour: the markings are fine slightly radiant lines reaching the median line.

Navicula retusa (fig. 179, *a*, *b*).—A species in

* The valves in the genera *Navicula*, *Pinnularia*, *Pleurosigma*, *Cocconeis*, and a few others, have a straight line or bar crossing the larger diameter: this is called the median line. In the centre of the line is a large dot called the central nodule; the ends of the median line terminate in two smaller nodules.

which the valves frequently occur *in situ* after boiling in acid: they adhere to the connecting zone more strongly than many other species. The outline of the frustule is oblong, sometimes nearly square; the ends straight or slightly rounded; the sides more or less constricted at the centre; the valve very narrow and straight, and the extremes rounded; the markings short and far apart.

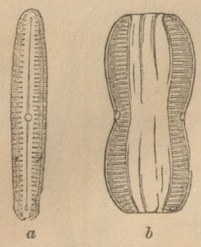


Fig. 179. *Navicula retusa*, × 400. *a*, valve; *b*, frustule.



Fig. 180. *Navicula cruciformis*, × 400.

Navicula cruciformis (fig. 180).—A curious little form with straight sides, slightly tapering as they approach the rounded ends; the median line is sometimes wavy; the markings are slightly radiant lines, reaching the central one, but are entirely absent opposite the central nodule, producing a blank space across the valve.

Navicula Trevelyana (fig. 181) has the sides straight, the ends rounded; markings coarse and radiant, suddenly shortening as they approach the centre, leaving a large circular blank space round the central nodule; median line conspicuously undulated.

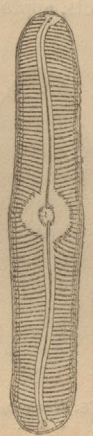


Fig. 181. *Navicula Trevelyana*, × 400.



Fig. 182. *Navicula Clepsydra*, × 400.

Navicula Clepsydra (fig. 182).—A very handsome species; the valve long, and gradually tapering to the rounded ends: markings consist of irregular-shaped dots, arranged in transverse lines: an oval smooth space surrounds the nodule.

Amphora.—The species of this genus somewhat resemble Navicula; the valves when separated have one margin convex and the other straight. Several species of this genus occur in sand-gathering. The following I have found most frequent.

Amphora arenaria (fig. 183).—This species is easily recognized by its transparency and apparent absence of markings; but with a high power it is found to possess them: neither the median line nor nodule is central, the former being curved in an opposite direction to the convex margin of the valve.

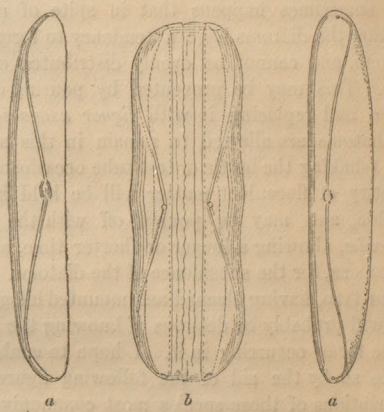


Fig. 183. *Amphora arenaria*, × 400. *a*, *a*, valves; *b*, frustule.

The observer will scarcely fail to detect in his gathering some representatives of the genus *Pleurosigma*: they are distinguished by the valves being more or less curved in opposite directions; the median line also following the contour of the valves.

Pleurosigma æstuarii (fig. 184).—A small form, somewhat broad at the centre; the outline of the valve is less sigmoid (S-like) than the median line; the markings consist of minute dots, arranged in oblique lines, requiring a good quarter-inch object-glass and oblique light to resolve them.



Fig. 184. *Pleurosigma æstuarii.*



Fig. 185. *Pleurosigma lanceolatum*, × 400.



Fig. 186. *Pleurosigma Fasciola.*

Pleurosigma lanceolatum (fig. 185).—Valves small, lancet-shaped, scarcely sigmoid; median line more so; markings very fine, oblique.

Pleurosigma Fasciola (fig. 186).—This species is remarkable for its long narrow ends, which are strongly curved in opposite directions; body of the valves lancet-shaped; markings dots, arranged in squares, but requiring a high power to resolve them.

Pleurosigma angulatum (fig. 187).—Outline of valve slightly angular at the centre; sigmoid curvature moderate; markings similar to the preceding.

Toxonidea is a genus closely allied to *Pleurosigma*, but the opposite sides of the valves are dissimilar, one being convex and the other straight.



Fig. 187. *Pleurosigma angulatum.*

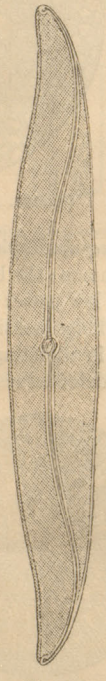


Fig. 188. *Toxonidea Gregoriana*, × 400.

Toxonidea Gregoriana (fig. 188).—One side of valve convex until it approaches the ends, where it curves slightly outwards; the other side straight; but as it approaches the ends it follows the curvature of the opposite side; median line same as convex margin; markings oblique, distinctly visible with a good quarter-inch objective.

Toxonidea insignis.—Smaller than the preceding one; margin very convex; ends very slightly curved; the other margin nearly straight the entire length of the valve; median line convex, much nearer the straight than the convex margin; markings much finer than in *Toxonidea Gregoriana*.

The following species of the genus *Nitzschia* will be found in the sand-gatherings.

Nitzschia vivax (fig. 189).—Valve long, gradually tapering towards the pointed ends; one margin with a conspicuous row of dots, very slightly incurved at the centre; markings distinct transverse lines.

Nitzschia virgata (fig. 190) resembles the preceding, but is shorter and more curved, and the marginal dots are elongated into short bars; markings transverse, very distinct.

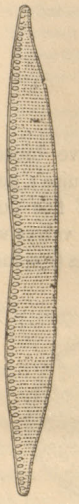


Fig. 189. *Nitzschia vivax.*



Fig. 190. *Nitzschia virgata*, × 400.

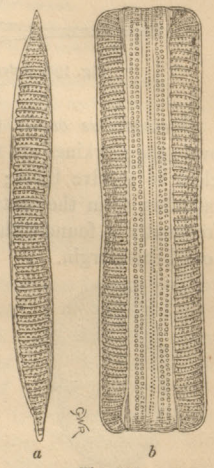


Fig. 191. *Epithemia marina*, × 400. *a*, valve; *b*, frustule.

Epithemia marina (fig. 191) resembles *Nitzschia vivax* in outline, but wants the marginal dots: the valve is crossed by distant lines, and is also dotted.

Attheya decora (fig. 192).—This curious little form is common in some gatherings: it must be searched for before using the nitric acid, the separation of the valves rendering it difficult to detect: the figure shows the two valves connected by the zone.

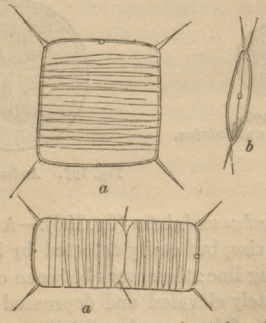


Fig. 192. *Attheya decora.* *a*, *a*, frustules; *b*, valve.

Asterionella Bleakleyi (fig. 193) cannot be found after treatment with acid. Each ray of the star consists of the two valves joined by the connecting zone; the frustules during life adhering to each other by the enlarged ends.

The circular species of Diatomaceæ are not gene-

rally so common as those of a linear form; the following may, however, often be detected.

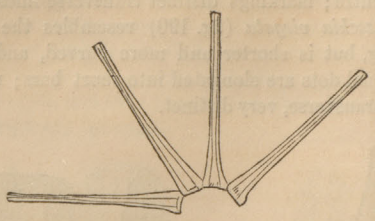


Fig. 193. *Asterionella Bleakleyi.*

Coscinodiscus ovalis (fig. 194).—Valve broadly oval: the markings are very fine, and require a good glass to resolve them; they consist of fine dots, radiating from the centre of the valve: valves will frequently be found with conspicuous dots (? spines) ound the margin.

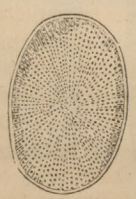


Fig. 194. *Coscinodiscus ovalis,* × 400.

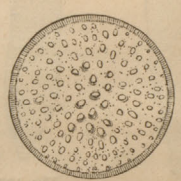


Fig. 195. *Coscinodiscus nitidus,* × 400.

Coscinodiscus nitidus (fig. 195).—A small form, but easily distinguished by its distant and brilliant dots, slightly decreasing in size as they approach the centre.

Coscinodiscus excentricus.—Small valves of the species occur in the sand-gatherings: the observer will readily recognize them by the excentric arrangements of the markings and the spinous margin.



Fig. 196. *Actinoptychus undulatus.*

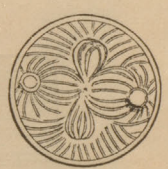


Fig. 197. *Auliscus sculptus.*

Actinoptychus undulatus (fig. 196).—A species very variable in size, but easily detected by its conspicuous radiating line: the spaces between each division are alternately elevated and depressed; the markings consist of hexagonal cells, the surface is also faintly punctate.

Auliscus sculptus (fig. 197).—Valves of this species are by no means common; but the diligent observer will probably be rewarded with a specimen or two: the valves are frequently slightly oval, with two circular elevations near the margins, and a smooth centre: the markings consist of lines, some of which radiate from the centre, and then suddenly converge towards the marginal elevation.

Eupodiscus Argus (fig. 198).—This fine form occurs but sparingly: the surface of the valve is marked with brilliant dots, beneath which appears an irregular arrangement of hexagonal cells of considerable thickness: near the margin will be seen three or more distinct elevations.

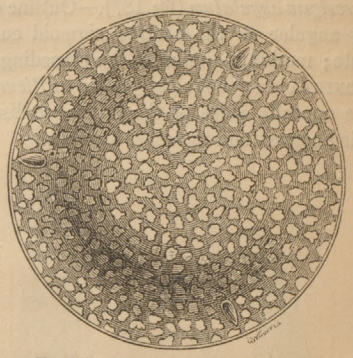


Fig. 198. *Eupodiscus Argus,* × 300.

Actinocyclus Ralfsii (fig. 199).—A species sometimes very common: the beautiful blue colour of the valves under a low power renders it a conspicuous object: the markings consist of small pearl-like dots, arranged in radiating series: a minute blank space may be detected near the margin (pseudo-nodule).

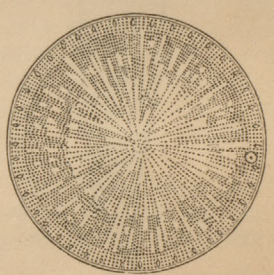


Fig. 199. *Actinocyclus Ralfsii.*

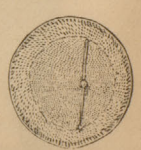


Fig. 200. *Cocconeis excentrica,* × 400.

Cocconeis excentrica (fig. 200).—A curious little species, apparently peculiar to sand-gatherings: the valve is nearly circular, with a conspicuous marginal band, consisting of small dots, much closer than those on the centre; median line and nodule not central.

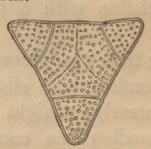


Fig. 201. *Triceratium alternans.*



Fig. 202. *Podosira compressa.*

Triceratium alternans (fig. 201).—This is the only species of the genus I have detected among the shore forms: valve small, triangular, with rounded

ends: a conspicuous line crosses each angle; surface of valve finely dotted.

Podosira? compressa (fig. 202).—A small form, common in some gatherings, the frustules generally occurring in pairs; the valves are elliptic and indistinctly marked with scattered dots.

The preceding species of Diatomaceæ only represent a very small number of the forms to be obtained in or near the sea: various species of seaweed, particularly the red weeds, will be often found covered with Diatomaceæ, the most frequent being *Grammatophora marina* (fig. 203) and *Grammatophora serpentina* (fig. 204), or more rarely with *Rhabdonema*

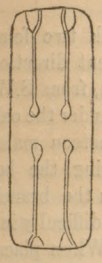


Fig. 203. *Grammatophora marina*, × 500.



Fig. 204. *Grammatophora serpentina*, × 500.

arcuatum: on the southern coast the observer will probably meet with *Isthmia nervosa* and *enervis* (fig. 205), *Amphitetras antediluviana*, and the graceful *Licmophora flabellata*. The bodies of the Noctilucæ

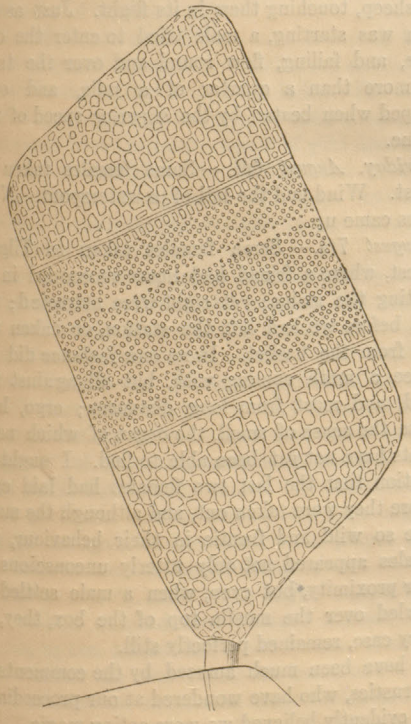


Fig. 205. *Isthmia enervis*, × 400

are often rich storehouses of Diatomaceæ, sometimes consisting almost entirely of *Rhizosolenia* or *Chætoceras*. The salt marshes and salt-water ditches will also be found rich in Diatomaceæ, such as *Campylodiscus, Surirella, Pleurosigma, Triceratium*, &c.; but space forbids even a list of species, much less a description of them, a task I should shrink from, and be tempted to exclaim with Spencer,—

"O what an endless taske on hand have I,
To count the sea's abundant progenie.
Whose fruitful seed far passeth those in land,
And also those which wonne in the azure sky."

"For though their numbers do much more surmount,
Yet all those same were there which erst I did recount."
Fairie Queene, canto XII.

Norwich. F. Kitton.

THE WOOLHOPE CLUB.

It is only a few instances that can be recorded of the published transactions of a local Natural History Society being worth more than the paper they are printed upon, except to the few notabilities who figure in them, and of course highly appreciate the glorification. The annual volume of the Transactions of the Woolhope Naturalists' Field Club for 1867 and again for 1868 partake of the exceptional character. They are highly creditable to the club, and of considerable interest to naturalists outside the club; in fact, they promise to form a series of volumes, without which, like those of the Tyneside and Berwickshire clubs, no naturalist's library would be complete.

These Transactions do not profess to attain the high technical character of some; but although more popular, they are sound, and not mere washings of slip-slop science. We note with pleasure the general tone of the communications, and their scientific accuracy. The photographs of remarkable trees of Herefordshire, the fossils of Herefordshire, the coloured lithographs of the fungi of Herefordshire, are not only excellent in themselves, but they are more excellent as indications that the Woolhope club appreciates the true mission of local clubs, to search out and illustrate the natural history of the county, or part of the county, in which they may be located.

We imagine that we read this volume with far greater interest, as affording reliable information concerning one county than if it contained learned monographs, communications on the races of Northern China, or notes of a voyage to the Hebrides.

This volume is profusely illustrated, but we cannot discover that it is on sale, or if so, at what price, since it would afford cause for regret if those not privileged to become members should also miss the privilege of possessing the Transactions.

We cannot particularize chapters, or papers, where so many are worthy; nor within our prescribed limits indulge in quotations, but we can and do hope to welcome this annual volume for many a year to come.

THE OAK EGGAR MOTH.

ALL entomologists are acquainted with the fact that certain females of moths emit some powerful odour not perceptible to human nostrils, but so attractive to the males of the same species, as to draw them from great distances to the spots where the females are placed; and that when under the influence of this attraction, the males lose all idea of self-preservation. Having reared from the larvæ several females this year, I have spent some days trying experiments with them, the results of which may be interesting to the readers of Science-Gossip.

Saturday, July 24th.—Took a female, deformed in the wings, to Bramber. Only two males came up in seven hours. Very few whitethorn hedges or oak-trees are in this neighbourhood.

Thursday, July 29th.—Took another female to Hassock's Gate station, between which and the entrance to the Clayton Tunnel over fifty males were attracted, twenty-five of which were taken. The female was in a box with a muslin top, and was being carried in a closed basket. When the first male appeared, he not only flew to, but tried to enter the basket. Placed the box on a heap of stones by the roadside, when eight males came up. Moved to a clover field, and put the box on the gate post; males came up freely, and allowed themselves to be taken off the post. Entered a field with a wood at the bottom; placed the box at the opposite corner, so as to have an uninterrupted view of over two hundred yards, and for more than two hours watched the proceedings of the males. The wind was very high from S.W., and blowing from us. Males came up singly, by twos and threes, at intervals; many we saw flying over the wood, and traced them coming with swallow-like flight to the box. Some, when within a yard or two of the box, dropped in the grass, and wildly approached, half crawling, half flying. Others, with peculiar fluttering movement, flew round and round, and then settled on the box, from which they were easily taken. Others, which flew past the box a dozen yards, and ten or twelve feet above, having apparently lost the scent, flew away against the wind, and were lost to view. One very battered male, with a peculiar tear in the right under wing, was taken four times. It was set free first to the right, then in front, next to the left, and lastly to the rear of the box, each time about one hundred yards off. After the last setting off, it was not seen again: in the first three cases it came back at once. This seemed conclusively to show the scent was borne by the wind. We also noticed that when above the box they had no difficulty in finding it, but when below, they appeared lost and wild. We next shifted our quarters to a small wood, where not one male appeared; but on our way back to the station several flew to the box, one, in fact, settled on my back. Between 12.20 p.m., when the first was taken, and 8 o'clock, when the last was caught, we counted over fifty.

Friday, July 30th.—Out at Hollingbury Combe for four hours; no males seen, and but few hedgerows. Next day, Saturday, the same female was taken to a copse on the Dyke Road, with a like result.

Wednesday, August 4th.—Took two females to Hassock's Gate, but in a different direction from the preceding week. Wind high, from S.W., with rain, and obliged to take shelter under the oak-trees, yet between 2 and 5 o'clock nineteen males were seen. Tried the effect of placing the boxes at varying heights. When hung on the branch of an oak, males seemed to have great difficulty in finding it, and flew round frantically. When placed on a hedge, they readily reached it by crawling and fluttering up the hedge. Next placed the boxes on the ground, when a male was seen approaching; it immediately flew to and settled on the box. Two curious incidents happened; a flock of sheep were passing just as a male was approaching; so we lowered the box, the male flew over the backs of the sheep, touching them in its flight. Just as the train was starting, a male tried to enter the carriage, and failing, flew round and over the train for more than a quarter of a mile, and only stopped when beaten by the superior speed of the engine.

Friday, August 6th.—Same females taken to Harst. Wind and the tail of a waterspout. Nine males came up.

August 7th.—Same females taken to Tilgate Forest, where a friend had never succeeded in attracting the males; yet eight were attracted; the first before we had left the station, or taken the box from the basket. In no one instance did we notice a moth coming with, but all against the wind, and most from long distances; ergo, how acute the sense of smell, the organ of which naturalists have not yet been able to find. I ought to mention that the last two females had laid eggs before they were taken out, and although the males were so wild and frantic in their behaviour, the females appeared not only utterly unconscious of their proximity, but even, when a male settled or crawled over the muslin top of the box, they, in every case, remained perfectly still.

I have been much amused by the comments of the rustics, who have wondered at our proceedings, and evidently believed we were acting magic.

Brighton, August. T. W. Wonfor.

SUTHERLAND GOLD.

[Preliminary Report by Dr. Lauder Lindsay. Presented to the *Geological Society of Edinburgh*, March 11th, 1869.]

HAVING had submitted to me by *the Geological Society of Edinburgh*, a sample of gold from the Kildonan Gold-field, Sutherlandshire, with a request that I would give an opinion as to its quality—I have compared its characters, 1. with those of many hundred specimens of native gold, which I have had opportunities of examining from all the principal auriferous countries of the world, of whose characters I made memoranda at the time I examined them; and 2. with those of gold-specimens in my private cabinet of minerals from (*a*) New Zealand, (*b*) Nova Scotia, and (*c*) Scotland (Lead Hills): and, as the result of the comparative examination, I beg to report my opinion:—That the Kildonan gold now submitted is of high average quality; and that, in particular, it so closely resembles gold brought from the famous Gabriel's gully in Otago, New Zealand, in 1862, that it is indistinguishable therefrom by the eye, even aided by the lens.

It may be safely accepted as proved, that the Sutherland gold now being obtained is of excellent quality. What has yet to be shown is the *amount* in which it occurs: and *this* can be proved only by experienced gold-miners; by shaft-sinking and quartz-crushing; by co-operation of labour and investiture of capital.

The Kildonan gold I have seen is mostly in the form of grains or nuggets of small size: smaller than those in my cabinet from Lead Hills. The *size of individual nuggets* is, however, of little consequence compared with the total amount of gold distributed in drifts or quartzites; for in the latter gold may be present in amount that will "pay" extraction when it is nevertheless *invisible* to the naked eye even aided by the lens.

But inasmuch as public interest mainly centres at present in the size of the nuggets that may yet be obtained in Sutherland, I append some quotations from Calvert's work on the "Gold Rocks of Great Britain and Ireland," published in 1853, which show that nuggets of very respectable size (though not to be compared with the "monster nuggets" of Australia) have been found in Scotland and in Sutherland. And I may add that there is no geological reason why equally large nuggets should not again be discovered when proper pains are bestowed on the search therefor.

Calvert says (p. 161): "The largest nugget found in Scotland weighed *three pounds!* another *thirty ounces*, or two pounds and a half! others of six and five ounces! the next largest one ounce and a half. Two of these are mentioned from Sutherlandshire and Clydesdale." Again (p. 163), "In 1840 a nugget was found (in Sutherlandshire) weighing one ounce and a half, in the bed of *the Kildonan*, a mountain stream"; and at p. 167 he tells us that the thirty-ounce nugget was from Crawford Moor, that is, Lead Hills of modern topographical nomenclature.

Now, at the present market price of Sutherland gold, the nuggets just mentioned would possess the following value in hard cash:—

1.	That of 3 lb.	£144
2.	„ 2½ „	£120
3.	„ 6 oz.	£24
4.	„ 5 „	£20
5.	„ 1½ „	£6

I may further add that the market price here quoted—as that which Sutherland Gold fetches in the markets of Inverness, Edinburgh, and Glasgow,—is greatly above that of much of the gold that is at present being produced (according to the mail just arrived) by the rich Thames gold field of Auckland, New Zealand, which is realizing only £2. 10s. to £3 per ounce.

THE SHORT-EARED OWL.

(*Strix brachyotus.*)

ALL sportsmen should be naturalists; their rambles across country in search of fur and feather give them opportunities for observation which fall to the lot of few besides themselves; while, by virtue of their "license to kill," they are led to explore sundry out-of-the-way holes and corners, which under other circumstances would be passed by. In this way they unavoidably become acquainted with many birds and animals which are not included in the list of "game," but which, nevertheless, by the beauty of their plumage, or by their graceful movements, contribute greatly to the pleasure of a day's shooting.

What sportsman does not remember the occasion of his first acquaintance with the Short-eared Owl? It was early in October, the weather still fine, but just beginning to get a little cold. In the cover through which we passed, the leaves had already changed colour, and the squirrels in their passage aloft sent down a thick shower to strew the ground, over which in turn the rabbits rustled as they scampered away at our approach. Anon, we heard the Green Woodpecker with his loud laughing cry, and stayed so long to watch his vigorous blows upon the old beech, that we had almost forgotten that our object in leaving home was "shooting." It was just about the time for the Woodcocks to arrive, and we were anxious to meet "the first cock of the season" and give him a warm reception. Passing out of the cover and crossing a stream, we found ourselves upon an open waste covered with two species of heath and the spongy *sphagnum*. A more promising spot could not be found. The Woodcocks, if arrived, would be sure to leave the cover in the evening to feed along the stream, and

would doubtless remain out all night. Partridges would surely be lower down among the dry heather, and very possibly we might find a Jack Snipe or two, for we have known the last-named to arrive as early as the 2nd of October. Inserting a couple of cartridges, we walked quietly on, when suddenly the dog stood, and before we could reach him, a brown long-winged bird rose out of the heather, and was sailing away. "It's one of these ere owls," exclaimed the keeper, with his usual disregard for species, and immediately brought it down. What a pity! It was a Short-eared Owl sure enough, and as we stretched out its beautiful barred wings, smoothed its soft plumage, and gazed into its large golden eyes, we felt pained to think that in another moment its life would be gone. The keeper said it was a destructive bird, but he was not prepared with any evidence to support his statement. To judge from the habits of other owls with which we are better acquainted, we should say that small birds, field mice, and beetles constitute its principal food.



Fig. 206. The Short-eared Owl (*Strix brachyotus*).

In the South of England, and in Ireland, the Short-eared Owl is known only as a winter visitant, and from usually arriving about the same time as the Woodcock, is often spoken of as the Woodcock-Owl. In the North of England and in Scotland this bird frequently remains throughout the year, and makes its nest upon the ground amongst heather, or in a marsh amongst sedge and rushes.

Mr. A. G. More, who has been at great pains to ascertain the distribution of this species in Great Britain during the nesting season,* says that it breeds in Suffolk, Norfolk,† and Cambridge; formerly also in Huntingdon (Mr. F. Bond). The nest has been once or twice taken near Scarborough (Mr. A. S. Bell); in Durham and Northumberland (Mr. Hancock and Rev. H. B. Tristram): Sir William Jardine also mentions the moorland ranges of Westmoreland and Cumberland as probable breeding-places. In Scotland the Short-eared Owl nests regularly in Dumfries (Sir W. Jardine); on Ailsa (Mr. R. Gray); in the counties of Selkirk

* See the *Ibis* for 1865, p. 15.

† With regard to Norfolk, Mr. Stevenson says: "In the spring these birds again proceed northwards towards the end of March, having, I believe, entirely ceased to breed in Norfolk, where, especially in the once fenny districts of the south-western parts of the county, they were commonly met with during the breeding season."—"Birds of Norfolk," 1866, vol. i. p. 50.

and Roxburgh occasionally (Mr. J. F. Whitecross); in Stirling (Mr. J. Murray); Clackmannan (Dr. P. Brotherson); in Perth (Mr. A. Pullar); in Ross, Sutherland, Caithness, the Hebrides and Orkneys. The eggs are usually five or six in number, white, smaller in size than those of the Barn Owl, and smoother in texture.

Unlike its congeners, the Short-eared Owl evinces no partiality for woods, but affects the open country, roosting upon the ground by day, under shelter of dry grass, sedge, or heath, and hunting for its food as soon as the sun has disappeared. We have often thought, however, when watching the flight of one

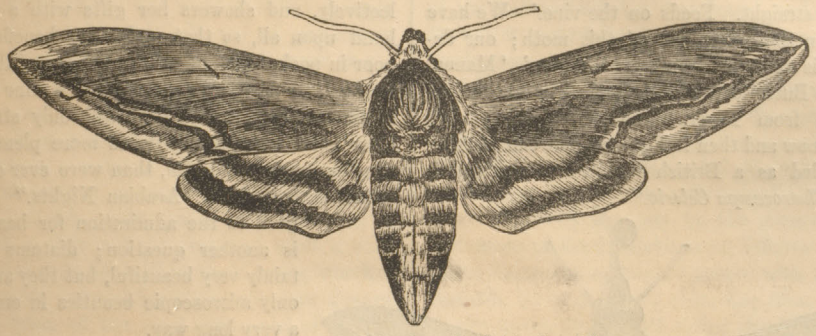


Fig. 207. The Privet Hawk-moth (*Sphinx ligustri*).

of these birds when disturbed in the daytime, that its bolder and more hawk-like flight, and the fact of its living out in the open country, indicated habits less nocturnal than those of other owls. Its sight is wonderfully keen, and if once disturbed and not shot, it is almost impossible to approach within range of it a second time. It has been stated on the authority of Capt. Portlock, in the Proceedings of the Royal Irish Academy (vol. i. p. 52), that in a rabbit warren at Magilligan, county of Londonderry, where the Short-eared Owl is a regular visitant in autumn, birds of this species have been seen at the entrance to the burrows, within which they retired when disturbed: more than one was shot on emerging from a hole, and one was taken in a trap placed at the entrance of a burrow when making its exit thence.* Whether they entered the holes for concealment, or for the purpose of carrying off young rabbits, the observer was not able to determine. There can be no doubt that the Short-eared Owl would take young rabbits where the opportunity occurred; but as it is seldom found in England except between the months of September and April, it cannot commit that havoc amongst young game birds of which, in common with other owls, it has been so frequently accused.

J. E. Harting.

* Thompson's "Natural History of Ireland" (Birds), vol. i. p. 91.

BRITISH MOTHS.*

THIS excellent work, which has appeared in monthly numbers, has now reached its conclusion, and, under the form of a volume in crimson and gold, becomes a candidate for the drawing-room table. The features which recommend it to students and lovers of nature are of more interest and value—to us no less, we imagine, than to the author himself—than mere external beauty or fitness for ornamental purposes. We have often been solicited to name a book containing figures of all the British moths, with plain descriptions, at a reasonable price. Such a book is the present, and we hope, for the sake both of author and publisher, that it will meet with the success it merits.

The insects which are *not* included in this volume are the Deltoids, Pyrales, Veneers, and Plumes, together with the Tortrices and Tineæ. "It was found impossible," writes Mr. Newman, "to make effective representations in wood of insects so minute as the majority of those contained in the four families I have mentioned, and extremely difficult to fix any scale by which to represent them of a uniformly increased size: the difficulty, indeed, seemed so great that the project has been abandoned for the present."

The "British Moths" aspires to be a popular guide, and hence its author employs plain language, divested as much as possible of technicalities. As an example, we quote his description of the Silver-striped Hawk-moth (*Chærocampa Celerio*), the figure of which, together with that of the Privet Hawk-moth, were kindly placed at our disposal by the publisher for this purpose.

"*The Silver-striped Hawk-moth.*—Fore wings brown, with a narrow silvery oblique stripe along the middle, commencing in a point at the extreme apex of the wing; this stripe is composed of four

* "An Illustrated Natural History of British Moths; with life-sized figures from nature of each species, and of the more striking varieties," by Edward Newman, F.L.S., &c. Royal 8vo. Tweedie, 337, Strand.

very delicate lines, the upper one of which is silvery; the hind margin of the wing has several delicate lines, and the veins of the wing are also silvery. Hind wings pink at the base; the rest pink-brown, with two black bands, which are united by six black lines. Thorax and body brown; thorax with an ash-coloured line on each side at the base of the wings, and two silvery lines; body with a row of white spots down the middle, and two silvery marks on each side of each segment. 'Caterpillar green or purplish-brown; on the fifth and sixth segments are two round black spots, dotted with yellow, and encircled with a yellow ring; those on the fifth segment larger. Horn brown, very slender, and quite straight. Feeds on the vine.' We have never seen the caterpillar of this moth; our description is extracted from Mr. Stainton's 'Manual of British Butterflies and Moths.' The author has copied it from Fryer. The perfect insect has occurred now and then in England, but can scarcely be regarded as a British insect. The scientific name is *Chærocampa Celerio*."



Fig. 208. The Silver-striped Hawk-moth (*Chærocampa Celerio*).

During the past month we had one of these caterpillars sent us by post alive and well. It is a true Briton, and we have confided it to the care of a practical entomologist, in the hope that it may one day make its appearance in its perfect form. The above description is substantially correct.

In commending this work to our readers, we may add, as an additional security for its accuracy, that the author acknowledges in his preface the "important services" of Mr. Doubleday, "through whose hands every sheet and every column has passed. Many omissions have thus been supplied and many errors expunged. . . . Mr. Doubleday has abundantly made up for my shortcomings, and has supplied me with information which, in many instances, has never before appeared in print."

For this useful and valuable contribution to popular natural history—in the highest acceptation of the word "popular"—Mr. Newman has our hearty thanks.

MICROSCOPICAL RESEARCH.

IN the last number of Science-Gossip, I noticed a paper taken from *Scientific Opinion*, under the above title, which very properly censures the waste of valuable time by thousands of incipient microscopists. All amateur microscopists seem to become what the author very aptly terms complete diatomaniacs; they have a rage similar to the Dutch shell and tulip mania.

The mere fact of possessing a rare object that very few others possess, is a miserly, selfish passion, unworthy of the lowest intellect. Nature works for the benefit of the whole human race collectively, and showers her gifts with a bountiful hand upon all, so that under her beneficence the poor in pocket may be rich in mind, and the richest in the land may find that there is a mine of wealth within their grasp, if they will only stretch out their hand towards it—riches more plentiful, and wonders more wonderful, than were ever dreamt of by the author of the "Arabian Nights." With regard to the admiration for beauty, that is another question; diatoms are certainly very beautiful, but they are not the only microscopic beauties in creation, by a very long way.

It is a strange thing that many people who term themselves naturalists, will run hundreds of miles over a country, and waste weeks and weeks for the possession of *rare* species. The chief object of the microscopists, I presume, is to resolve our most difficult problems in histology, and to lessen the number of our already too abundant species.

What credit does it reflect upon any man because he has got a species that nobody else has, or that he has discovered a species that nobody else has—Smithii, Brownii, Jonesii, Robinsonii? None, in my opinion. If there is any honour to be gained, it is in the reduction of species, and for the working out of such problems, brains, patience, and untiring perseverance are required to any extent. Infatuated species-hunters are not naturalists in the true sense of the term, and the time taken up in running over the country after new and rare species or varieties, might be more profitably spent.

Allow me to suggest a subject for microscopic investigation—which is in a high state of confusion—a subject which will require the eyes of thousands of microscopists to search out its mysteries for generations possibly, a subject which is of vital consequence to the human race, as it has to do with the problems of life, health, disease, and death. I allude to the microscopic fungi.

The micro fungi in beauty of form and interest far outstrip the diatoms. Their extraordinary

beauty and immense profusion, there scarcely being the smallest corner of the earth that will not produce them, make them objects of extreme interest to the microscopist. If any one will get my paper on "Vaccination *versus* Nature" of the publishers, 475, Oxford-street, they will, on reading that, see how important it is that our knowledge of the micro fungi should be increased as soon as possible. Every observer has it in his power to do a little, and in a case like this he will have the satisfaction of knowing that he is not only revelling amongst a very profusion of forms of the most extraordinary beauty, but that, however little original observation he may produce, he is paving the way to free the human race of some of the most dreadful diseases to which it is subjected. If any of our microscopists will obtain Mr. M. C. Cooke's work on the micro fungi—read that, get a foundation for their knowledge, and then buy a number of tumblers or glass vessels or pots of any sort filled with water, and commence a series of original observations by dropping all sorts of animal and vegetable products in the said vessels—take the common house-fly to begin with — they will be surprised what a wide field for discovery lies within their grasp, wonders infinitely more astonishing than were ever dreamt of in the brain of the most infatuated of opium-eaters. Let them pencil down in sketches and notes everything they see, and in a short time they will be thunderstruck at the amount of original facts so easily obtained; they will be surprised that the mightiest problems that sway the world are close under their very nose, patiently waiting to be brought to light. They will then find how mistaken they have been to run 300 miles after Smithii, Brownii, Jonesii, and Robinsonii, when by their own fireside the greatest, the most sublime wonders in creation have been constantly bobbing in their eyes, and buzzing in their ears.

If only for the sake of suffering humanity, I appeal to my fellow-workers to tender their mite towards this great object.

MACLEOD OF SKYE.

INSECT VISITATION.

NORFOLK has shared in the advantages derived from the timely visit of immense flights of ladybirds, and the plague of aphides, from which vegetation was suffering severely, has rapidly disappeared before them. There has been great discussion as to how far we are indebted to immigration for these friendly visitors, and from whence they came; of course opinions differed greatly, but I am inclined to believe we need not revert to that shadowy land, "the Continent," to account for their presence.

In my own garden there have been immense numbers; but the number of larvæ I observed was also very great. Their onward movement in search of fresh supplies of food would, I think, account for their congregation on the shore, which has led to the impression that they had just arrived in this country; but their flight, although strong and rapid, is not sufficiently sustained to carry them far over the sea, into which they would drop exhausted and perish.

In support of this view I will mention a circumstance which occurred off the Norfolk coast on the 24th July. A yacht belonging to Mr. Cresswell, of Lynn, sailing off Hunstanton, passed through a mass of dead ladybirds, accumulated on the surface of the water, about ten feet broad, and extending for two or three miles, bearing the appearance of a black stripe on the water.

This occurred in the Wash, about nine miles from the Norfolk and thirteen from the Lincolnshire shore; the wind was very light in occasional puffs from off the Norfolk shore, and the exact locality the entrance to a channel called the "Bulldogs."

Mr. Cresswell accounts for the presence of this vast mass of dead ladybirds as follows:—At low water there are uncovered sands, with pools and channels between them, extending from the shore to the navigable channel called the Bulldogs; he presumes that the mass of dead ladybirds in the Bulldogs were drowned by the rising water covering the sands on which they were, and brought by the current into the vast mass the *Wild Duck* passed through, which had accumulated on the crown of the sands.

There is very little doubt these ladybirds left the Norfolk shore, and alighting on the first uncovered spot they came to, were saved from dropping exhausted into the sea, only to be drowned by the rising flood which covered their island resting-place. But had they possessed the strength to renew their flight, and chance directed them either to the Norfolk or Lincolnshire coast, any person witnessing their *return* would probably have been impressed with the belief that they were a fresh arrival from "the Continent."

At the same time and place the *Wild Duck* was surrounded by an immense swarm of what at the time were believed to be wasps, but which from the description I have no doubt were Syrphidæ, of at least two species, one much larger than the other. These were so numerous that they were swept from the sails in thousands, and whilst one man steered, another had to be employed in brushing them off him; as it was, they did not escape being bitten, the bite being attended with considerable pain and swelling.

These Syrphidæ have probably accompanied the ladybirds in their flight; but their superior powers on the wing had saved them for the time from the fate which had overtaken the latter; only for a time

however, as they would soon add their numbers to the slain.

The thought suggests itself whether this inclination to leave the shore (if at all common) is not a provision of Nature to rid us of what, after having performed its allotted purpose, would prove a serious nuisance if remaining.

Norwich. T. Southwell.

N.B.—When I wrote the above, I had not observed Mr. Cordeaux's note in the *Zoologist*, S. S., p. 1839. On 24th July, the same day as above referred to, about thirteen miles from the Lincolnshire coast, his cutter ran through numerous belts of water, "from a few yards to some hundreds in breadth, and extending both to port and starboard as far as the eye could reach," so full of myriads of green-winged aphides as to present a "thick pea-soup appearance." The air in and around this city literally swarmed with these insects during the whole of that day. Mr. Cordeaux also mentions the astonishing numbers of the larvæ of the Ladybird in the pea-fields,—ten or twelve on each plant. "There were many of the perfect insects, but the larvæ outnumbered the parents as fifty to one." T. S.

THE LAY OF THE OLD LADYBIRD.

Confound 'em! ladybirds and beadles,
And daddy-long-legses, as well!
That keep one thus on pins and needles,
Lor! what to do I cannot tell.
Ah, flies and spiders, legs and wings,
I can't abide them creeping things!

There's flies! One wants a little sleep,
And just a-dropping in a doze,
When, drat the things, they buzz and creep
Upon a poor old lady's nose.
Lor, how they tickles and they stings!
I can't abide them creeping things!

There's earwigs dropping in your cup
When in the arbour you takes tea.
There's what o' night-time wakes you up,
That will not budge, and seldom flee.
Distress such recollection brings—
I can't abide them creeping things!

Confound 'em! beadles, gnats, and wopses,
Flies, spiders, ladybirds—what-nots!
I'd like to stomp 'em all to copses
As ants is, so says Dr. Watts.
I find to life too much they clings—
I can't abide them creeping things!—*Fun.*

THE ENTOMOLOGICAL SOCIETY OF LONDON.

In the latter part of last, and earlier years of the present century, several attempts were made to establish an Entomological Society in London. These proved all more or less abortive, the associations thus formed being chiefly characterized by the brevity of their existence; though one actually so far succeeded as to publish two parts of "Transactions." The now existing Society was instituted in 1834, "for the improvement and diffusion of Entomological Science" (*vide* chap. i. of its Bye-laws), and nearly half a dozen of the gentlemen composing the first council are still living. During the thirty-five years that have elapsed since that period, it has published sixteen bulky volumes of "Transactions" on all branches of Entomology, and now issues, in parts, a thick volume annually, embellished with many beautiful plates. Though the number of its members is considerable, we do not think it receives the amount of support from our countrymen who pursue the study that is justly due to it; and we feel assured that many do not join its ranks from ignorance of the *modus operandi*, and thereby lose much pleasure they would otherwise derive from attending its meetings, and from borrowing books from its extensive library.

The meetings are now held, by permission, in the rooms of the Linnean Society in Burlington House, and are conducted in a more conversational style than is usual in many of our Scientific Societies. Admissions are granted in two forms—in one, payment of a small admission fee and an annual subscription are necessary—in the other the subscription only is demanded. The advantages are equal, save that those gentlemen joining under the latter condition can take no part in the executive. The Transactions are sent, as soon as published, *gratis* to gentlemen who reside outside a radius of fifteen miles from London, whereas those who live within that radius can obtain them at half price; it being considered that country members, through inability to regularly attend the meetings, are placed in a less favourable position than their metropolitan colleagues.

The next meeting will take place on the 1st of November, and we are at liberty to state that all information will be gladly afforded to any Entomologist who may think of joining, by either of the two secretaries; viz., Mr. J. W. Dunning, M.A., F.L.S., of 24, Old Buildings, Lincoln's-Inn, or Mr. R. M'Lachlan, F.L.S., of 20, Limes Grove, North Lewisham.

The library is kept at 12, Bedford-row, Holborn, and the Librarian attends there every Monday from 2 to 7 p.m.

ZOOLOGY.

Mice on the Sill.—An old Quaker friend told me the other day she was once nursing her father in a quiet parlour in their house in the "close," when she observed, on the window-sill, a couple of mice sunning themselves. She put some crumbs for them next morning, and, finding they were taken away, continued to do so daily. The animals came, and in due time brought young ones, which partook of the meal. During the season three young broods were thus brought to the window-sill and taught to feed themselves. If one dropped a crumb carelessly it was sure to be chastised with a smart rap, when it took up the crumb and carried it away. The nest was close by in a hole in the wall, made by the chance removal of a brick. The sight, she said, was very pretty. The mice ran up by the stems of a asmine, which grew by the wall up to the window. —*L. B.*

Sympathetic Puss.—The same person who narrated the mouse anecdote to me said she had an old lady friend who was grievously afflicted with rheumatic gout in the hand; her fingers and joints were quite distorted and drawn up like claws. But she managed, somehow, to write, and sat at her desk painfully making the letters. Close beside her, hour after hour, sat her favourite cat watching the process. In course of time puss had kittens, which, strange to tell, had their paws all drawn up and distorted precisely like the old lady's hands. They were malformed in every case, and the whole batch had to be drowned. My Quaker friend, who narrated this to me, is one who weighs her words, and carefully adheres to the truth, so that I can speak after her with confidence.—*L. B.*

An Affectionate Tortoise.—I dined a few days ago at a gentleman's house in this vicinity, and was asked if I would like to go out into the grounds and see the tortoise. We found the creature, a very large one of its kind, basking in the sun on the upper terrace grass walk, and it evidently knew the master's voice right well, for directly Mr. —— took it in his hands and lifted it up, the tortoise put out its fore-feet up against his breast and stretched forth its long neck, laying its face on his cheek in the most confiding way, just as a tame cat, or any other domestic animal, might do in order to be caressed. I truthfully could not (had I not seen it) have believed it possible for the eye of a tortoise to have expressed such affection; but he evidently did not approve of strangers taking liberties with him. Immediately any of the ladies present, or myself, touched him, he withdrew into his shell house with great dignity. Mr. —— told me the tortoise came into his possession some thirty years ago, but during a part of this time he had lost sight of it for a period of six years, when one day a workman on the estate came to ask him to look at "a wonderful big toad—a toad with a stone back." The toad was the long missing tortoise, whom old Baird had turned up in a neighbouring field. The tortoise has ever since lived comfortably in the grounds, always making his appearance in summer on the same terrace to be treated with fruit, which he much enjoys. The lack of knowledge respecting natural history shown by some of the lower classes is really most remarkable. "A toad with a stone back" reminds me of a tale told me yesterday of an old man who lived not very far from here. His master, a Pembrokeshire squire, took him up to town the year of the Exhibition. Jack was never trusted out alone lest he should lose his way; but one evening his master sent him to a tobacconist's shop close by for some of the weed. Jack had the order written down; while the shopman turned to weigh out the article, Jack laid half a crown on the counter, and a large monkey quietly swept it into the till. Jack having received the parcel waited for change; the shopman, who had not noticed the laying down of the money, waited for payment. Jack talked Welsh, the man English, and at last a boy was sent home with Jack, his master being known to the shopkeeper. Then came Jack's explanation to his master, which translated was as follows: "I did put down the silver, and the *gentleman's father, the old man as sits on the counter*, did put it in the till and the gentleman did give me no change."—*Helen E. Watney, Gwe Cwm.*

Voracity of the Jack.—On Tuesday last Mr. Thomas Taylor, of the George Hotel, Halstead, whilst spinning for jack, in the Colne, near Box-mills, captured one weighing 3 lb. Noticing that its body was an unusual size he opened it and found in its pouch a young moor-hen and nine roach! One of the roach weighed a quarter of a pound.—*Halstead Times, August* 14.

Insects in 1869.—Is not the clouded yellow (*Colias edusa*) unusually plentiful this summer? and are not the small tortoise-shell (*Vanessa urticæ*), and the painted lady (*Cynthia cardui*) rather scarce? I saw a specimen of the clouded yellow on the road from Flushing to Mylor Bridge in Cornwall, the other day; another at St. Keyne, and, I think, another between this place, Lyme Regis, and Axminster. The painted lady (*Cynthia cardui*) I saw on the road from Lyme Regis to Charmouth on the 1st of March, and the small tortoise-shell here on the 10th of April, the weather being then fine and warm. I do not remember seeing either since. I noticed several common white and blue butterflies at Flushing this summer, but I fancy the former has not been so common in this neighbourhood as it was last year. The

meadow brown (*Hipparchia janira*) is, as usual, abundant. I have seen at least three humming-bird hawk-moths—two in the garden and one at Uplyme.—*F. J. D. Hinton, Lyme Regis.*

The Scarce Spotted Hawk-Moth (*Sphinx Galii*).—A caterpillar of this exceedingly rare insect was taken in this vicinity in the latter end of August. The following description is to be found in J. O. Westwood's "British Moths and their Transformations":—"The caterpillar is of an olive green colour, with a yellow dorsal line, and a row of yellow pear-shaped spots, bordered with black on each side of each segment. The spiracles are yellow, and there is a line of the same colour above the legs; of which latter the fore ones are black, and the pro-legs flesh-coloured. It feeds on several species of Galium, such as the wild madder (*G. mollugo*), and the yellow lady's bedstraw (*G. verum*)." It is at present living on the latter plant.—*J. H. Fox, Harleston, Norfolk.*

Insects of the Season.—I have noticed during this year a very great scarcity of the large garden white (*Pieris brassicæ*), and although the small white (*P. rapæ*) has appeared in very few numbers to what it usually does, the visits of the large white were far more rare. There has been, however, an extreme abundance of the small tortoise-shell (*V. urticæ*), and the peacock butterfly (*V. Io*); whilst among our moths the bright-line brown-eye (*M. oleracea*) proved a perfect nuisance, collecting in large numbers in our bedrooms, and the willow beauty (*Alcis rhomboidaria*) has also been extremely abundant. When at Cardigan, S. Wales, last month, scarcely a bush could be touched without starting half a dozen or more magpie moths (*Abraxas grossulariata*) off on the wing; whilst in the afternoon they were fluttering about amongst the hedge-rows almost as numerously as the meadow-browns and large heaths. The caterpillar of the privet hawk-moth has been far more abundant than last year. I collected in a few hours last week upwards of six-and-thirty fine specimens on a low privet-bush. At Gwbert, the famous watering-place of Cardigan, and opposite the island, there is a large tract of ground covered with gorse and heather; the vegetation about here was literally strewn with the empty chrysalis of the six-spot Burnet moth (*Anthrocera filipendulæ*) during the past month.—*W. Bevan Lewis, L.R.C.P. Lond.*

Centre Barred Sallow (*Cirrœdia Xerampelina*).—Having had the pleasure of taking two specimens of this beautiful species I thought it would interest some of the readers of Science-Gossip, both specimens being taken at the beginning of this month (September). This species has been taken more than once before by myself and my friend, Mr. W. J. Smith, at light.—*C. B. Doward, Worcester.*

Cats and Starfish.—In answer to W. Field in September number allow me to record the case of a favourite and very tame cat who is always glad to devour a starfish when one dies in the aquarium and never seems at all the worse for it. I have known her do it several times this spring and summer whilst staying at her home in the neighbourhood of Ramsgate. In whatever part of the kingdom the piece of "folk-lore" mentioned by W. Field may be prevalent, I think it must be entirely unfounded.—*I. G. H.*

A 'cute Squirrel.—A very curious instance of squirrel sagacity has lately come to my knowledge. It was related to me by an eye-witness to the fact, now some years ago. A tame squirrel having swarmed up the bell-pull threw down from the end of the mantel-shelf an imitation egg and egg-cup, in one. He immediately descended and endeavoured, having secured it in his paws, to re-ascend with it. Failing in this he again climbed up the rope, but evidently not satisfied, came down again, and this time having managed to secure the ornament in some way that allowed him to use his paws, ascended the rope with it and replaced it on the mantel-shelf. This was witnessed at a friend's house by a relative of mine, the friend also being present.—*W. Hambrough, Worthing.*

Animal from Salt Lake.—In the April number of Science-Gossip is figured an animal from Salt Lake, which the correspondent and editor seem unable to identify. It is undoubtedly the larva of *Ephydra*, of which the fly and puparium have been figured in the *Naturalist*, vol. ii., p. 278, and a short account given of the occurrence of other species in the salt-works in Germany; the Equality Salt-works, Gallatin County, Illinois; the Salt Lake Mono, California; and the coasts of Labrador and Massachusetts, where it lives in salt or brackish water.—*A. S. P. in "American Naturalist" for Sept.* 1869.

Spiders as an Article of Food.—Reaumur tells us of a young lady, who when she walked in her grounds never saw a spider that she did not take and crack upon the spot. Another female, the celebrated Anna Maria Schurman, used to eat them like nuts, which she affirmed they much resembled in taste, excusing her propensity by saying that she was born under the sign Scorpio. If you wish for the authority of the learned, Lalande, the celebrated French astronomer, was, as Latreille witnessed, equally fond of these delicacies. And lastly, if not content with taking them seriatim, you should feel desirous of eating them by handfuls, you may shelter yourself under the authority of the German immortalized by Koesel, who used to spread them upon his bread like butter, observing that he found them very useful "um sich auszulaxiren."—*Kirby's Introd. to Entom.*

BOTANY.

Marjoram.—I was much interested in Mrs. Watney's article on "Common Herbs" last month (page 178), in which she so well described the sweet marjoram and its uses. But Mrs. Watney states that it is slightly puzzling with regard to the properties of this plant, as it apparently shows that they are identical with narcotic principles when the plant is put into beer while fermenting. This is not, however, the case; and such facts as these are puzzling to many, because the reactions are seldom expressed in any "manual." The reactions and results are only obtained by close observation and study; but sometimes a little thought, and knowledge of chemistry as well, will explain such reactions. Marjoram contains an *alkaloid* (*e.g.*, like alkalies) which unites with the free acid in the beer, neutralizing it, therefore rendering its presence non-perceptible. Yeast consists of several kinds of fungus, i.e., *Monas crepusculum*, *Bacterium termo*, *Torula*, *Penicillium glaucum*, &c., and these fungi excite alcoholic fermentation, then acetic acid fermentation. Some acetic acid is also formed during the first stage, or alcoholic fermentation, and the presence of an alkaloid prevents this giving a greater percentage of alcohol. Marjoram containing the alkaloid acts as above. In reality, then, the alcohol intoxicates, not the marjoram.—*George Newlyn.*

The Bee Orchis.—We have received several communications in reply to "B.'s" inquiry respecting the Bee Orchis, and are informed that it may be found in Castle Hedingham, Little Maplestead, Colne-Engaine, &c. One botanical correspondent suggests that to give its habitat more definitely to the public would ultimately exterminate the plant from the district, but genuine collectors may have further information on inquiry at our office.—*Halstead Times, Aug.* 14.

British Fungi.—"A Handbook of British Fungi," by M. C. Cooke, is announced as in course of preparation. It will form a thick crown octavo volume, and will be published at half a guinea to subscribers as soon as sufficient names have been received to guarantee the venture. This work is intended to contain full descriptions of every known species of fungus hitherto found in the British Isles, with figures illustrating the genera. Subscribers' names will be gladly received by the author through the publisher of Science-Gossip, 192, Piccadilly, W.

Geranium Seeds.—At page 191 of your present volume reference is made by a correspondent, Mrs. Watney, to the fruit of the Cranesbills, which is described as bearing a sort of screw. There is a little confusion here which perhaps you will think it desirable to correct. It is the allied genus *Erodium* in which the tail of the carpel coils up spirally after splitting from the beak. In geranium proper the tail does not assume the spiral form; this character affords, therefore, a ready mode of distinguishing the seeds of the two genera. The spiral coil appears to act like the feathered shaft of an arrow. The seed being the heaviest naturally falls downwards, and the spiral will usually be found projecting above ground, when the carpel, with its inclosed seed, becomes buried.—*W. T., Ipswich.*

Holly.—I fancy the term Holly, our English name for the *Ilex aquifolium*, is derived from *Hellig*, the Welsh name for the tree. The Holly surely is a true native of Great Britain, and Welsh the original language; therefore, what more probable than that the Saxons called the tree Holly, a corruption of Hellig? The "Saxon alphabet" was used by the Britons many centuries before the Saxon invasion; this old writings fully prove; therefore we have reason to believe that the Saxons had no letters of their own, but that the one now called Saxon was taught them by the Britons. Alfred's tutors were both Welshmen. Had the Saxons brought any letters from Saxony there would surely be in some part of Germany Saxon characters still to be found, and I am told there are not; so I come to the sage conclusion that my native language is very ancient, and Holly derived from Hellig.—*H. E. Watney.*

Olive in Bloom.—I don't know whether the fact of an olive-tree grown in this country having this year put forth its bloom is a novel one. The tree is an interesting one, as it has all the characteristics on a small scale of the olive of the South, both as regards form and the big root protruding from the soil. Up to last year it had been growing in a pot, it was then transferred to a cask and planted in some rich soil. The tree is about five feet six inches high from the base of the trunk. This is the first year in which it has flowered. In the South of France they flower in, I believe, the seventh year. The olive in question is at least ten years old. In winter it is placed in a conservatory, and in summer in a sheltered spot in the garden. Since we have had it no blight of any kind has ever been detected on its leaves.—*P., Margate.*

Lobelia urens.—I have had *Lobelia urens* in full bloom in my garden three years in succession. I collected the plants when in Devonshire for my holidays. They blossom well, but do not ripen seed in cultivation. Are any of your readers acquainted with a *deep blue* variety of *Scilla autumnalis?* I have found it early in August covering the sandy downs near the sea with its brilliant blue flowers. In colour and habit it resembles *Scilla verna*. In June I found the grass-like tufts of leaves, which were turned brown and withered before the flowers appeared. I shall be glad of any information on the subject.—*M. C., Kent.*

MICROSCOPY.

A New Cell.—No one can better understand the difficulties which a young microscopist meets with, than he who has been compelled to fall back upon the resources of his own inventive capacities to meet those emergencies which present themselves on the very threshold of a new study. Perhaps one of the first of these difficulties is the formation of a cell. Our standard works on the microscope seem to give us an exhaustive stock of information on this point, but yet this question remains unanswered, viz.,—How to prepare at the *lowest cost* a large stock of *neat* and *efficient* cells? The merest tyro is aware that a revolving disc, a diamond pencil, &c., will supply means for the construction of neat cells; but all this involves a certain outlay which many would hesitate to expend. A steady hand can draw a fair circle of Brunswick black on a slide, but in order that the cell should be deep, each successive layer should be firmly dried before the application of a second, and the various annoyances which this plan often gives rise to are known only too well to those who are practically familiar with this method. But purchase a box of endless elastic bands,* and the addition of a jar of Brunswick black will now supply all the requisite material for the formation of a large stock of good and neat cells. Slip one of these bands on to the blades of a pair of scissors, slightly opening the latter to keep the band near the points, and prevent it from slipping off; now paint it over with a thin layer of Brunswick black, allow the band to fall flat on the centre of a glass slide, fix your object, and gently place your thin cover over it, which will firmly adhere to the band; this is cell No. 1. For cell No. 2 another band is slid on to the scissors after the first band has been painted; the pressure of a forceps will cause them to adhere, and now you have your cell double the depth of the first. The bands which I use are ½ an inch in diameter, and with these the deepest cell advisable to be made is that of three bands; should a deeper cell be required bands of a larger diameter are necessary. I have a large number of objects mounted in this way, the majority being dry preparations, but I find this cell is equally serviceable for mounting in glycerine or Goadby's solution. The diamond pencil, revolving disc, moulded cell, &c., are all desirable acquisitions, but for my own part I prefer the elastic cell on account of its neatness and simplicity. Should any of your readers feel inclined to try this method I can confidently assure them they will find it the cheapest and most satisfactory.—*W. Bevan Lewis, L.R.C.P. Lond.*

Markings of Diatoms.—Having just been reading Mr. Reade's curious investigations upon diatoms with the equilateral prism (see *Journal of the Royal Microscopical Society* for July and August), I took up a slide of *Triceratium favus*, and viewing it with an eighth object glass, by parallel rays, I noticed that the areolæ possessed the same property as the corneules of the compound eyes of insects, so that the image of any object, interposed between the mirror and the stage, was seen in each of them. Looking afterwards at a *beetle's eye* under the same power and illumination, I was surprised to notice how exactly the same effects might be produced upon it as upon the triceratium, by slightly altering the focus of the object-glass or the position of the mirror. Spherules, hexagons, or pyramids, were equally produceable at will in either slide. May not our knowledge of the one give some clue to the real formation of the other? By careful focussing, a double layer of structure may be seen in the Triceratium valve, very similar to that of Heliopelta; each apparent hexagon being made up of a series of circular areolations, three forming each side of the hexagon, and seven in the centre; while on altering the focus the upper surface of the valve gives the appearance of large nodules, as described by Mr. Reade.—*R.*

Hints for Workers.—Your interesting article on the sertularians set me thinking of what a pity it is that our rapidly increasing class of amateur microscopists should not be urged to take every opportunity of adding to their knowledge of natural history in all branches, so as to insure the greatest possible accuracy in the nomenclature of their slides. For my own part I take the greatest pains to secure this accuracy. I like to have my labels as detailed as possible in their information, showing where necessary, class, order, section, family, genus, and species; and I never regret having to change these labels on any increase of knowledge. This is one of the manners in which amateur microscopy can be made really *educating*, and not a mere mania for the collecting of *pretty slides*. Yet I know cabinets where the organisms which your article has described are simply labelled as "corallines," a name which though at one time received has now become entirely inappropriate, because unfortunately it is now applied only to a division of plants (*Algæ*) while the sertularians are certainly animal. Being on this subject I cannot avoid appealing to you and to your readers (though it is somewhat presumptuous in me to differ thus from Mr. Hincks) as to whether it is not a pity to revive the term "zoophyte," as applied to this or to any division of polypes. As implying more than we know, or I may say what we know to be false; they are not *animal plants* (to translate the word), but simply and entirely animal. And is it not unnecessary where polyzoa, or bryozoa, would answer as well?—*I. G. H.*

* Sold by W. Warne & Co., also by Perry & Co

NOTES AND QUERIES.

Deceiving the Nerves.—Take a pin between the tip of the forefinger and thumb, roll it about quickly but lightly, and in a few seconds it will appear to increase in size and to become covered with a soft leathery substance. The nerves in recording the sensation evidently do not allow for the thickness of the insensitive epidermis between themselves and the pin, hence the error.—*F. W. M.*

Cleaning Shells.—Would any of your correspondents inform me of the best method for removing the epidermis or outer coating of shells, and afterwards polishing them if required? By doing so you would much oblige your subscriber.—*Owen T. Williams.*

Bulfinches' Food.—Seeing in your number of Science-Gossip for the present month, a request from L. C. Whelan for information as to the best food for Bullfinches, I beg to say I have a pair of those birds in perfect health and beauty. I gave them all last winter *plenty* of privet and other winter berries. In the spring they were supplied daily with a quantity of primroses, which they eagerly picked to pieces and eat some part of them. When these could no longer be obtained I gave them bunches of daisies, which were treated in like manner; for them the hen-bird especially was quite clamorous when any were brought into the room, not ceasing to call out and flutter her wings till some were put between the bars of the cage. Wild strawberries are also a very favourite repast, and any kind of grass seeds from the hay fields were devoured in quantities. I am now giving them any kind of plant in seed that can be found in the hedges, such as plaintain shepherd's ruse, dart, ground ivy, &c. I keep the seed boxes in the cage filled with rape and canary, but they eat but little of these when they have other things. I only use hemp as a dainty to induce them to feed from my hand, or as a reward for the performance of some little kind, such as ringing their bell, &c. They have plenty of fresh water every morning for bathing. The birds are also very fond of milk thistle and groundsel in house.—*Charlotte Hedger.*

Dr. Thudichum's Rabbit.—After reading the article on the death of Dr. Thudichum's rabbit that appeared in the August number of Science-Gossip, it occurred to me that some account of its life might prove acceptable. Through the courtesy of Dr. T. I am enabled to supply the following particulars: The rabbit was trichinised; in 1864 it survived a severe trichinosis, only by means of artificial feeding, and being kept in a Turkish bath; it recovered, and in the following and second year had three nests of young, one of these only survived. The rabbit exhibited its trichinæ on various occasions before the College of Physicians, London; British Medical Association, Cambridge; Epidemiological Society, and Society of Arts, London; also to numerous private persons. They were always taken living out of the loins of the animal. At the time of its death all the trichinæ were living and strong, another proof of the longevity of this remarkable parasite. The rabbit suffered much from a kind of mange which was only kept in check by painting with benzoyle and oil. It ate oats, clover, and bread, also drank milk with avidity to which it had become partial during its illness. No small particle of flesh was ever removed from its body which did not contain at least ten trichinæ; a moderate estimate would bring the number of worms and capsules contained in it to the amount of two and a half millions. It sickened for three weeks; ate less and less, lost flesh, became almost paralysed on its hind legs, and died. Dr. Thudichum writes: "It quite moved me when I came to the laboratory and found my friend and companion of five years, the sharer of many successes, dead; but you have embalmed it finely. It will, I am sure, give instruction and pleasure to many who look over your marvellous slides." The cause of the rabbit's death was inflammation of the intestines, the lungs being congested nearly the whole length.—*J. T. Norman.*

Tom-toddies.—I always, when a child, heard the rhyme mentioned by your correspondent, page 164, applied to Tadpoles, not "snails," and we always called them "tom-toddies." The former certainly *is*

"All head and no body,"

the "snail" is *toute au contraire!*—*E. H. W.*

The Triodon.—Can any of the readers of Science-Gossip inform me if there is any truth in the following description of a "Monster of the Deep," the Triodon, which I have taken from a book for children, entitled "Seas, Ships, and Adventures," and bearing date 1850:—"The strange-looking creature that is called by this name (i.e., Triodon) is a fish that is found in the Indian Ocean, and has an enormous dewlap, almost as long as the body and twice as high, which is supported in front by a very large bone. It belongs to an order of fishes that have the power of inflating themselves like balloons, and floating themselves on the surface of the water. The surface of their dewlap bristles with a great number of small rough crests, placed obliquely. Only one species of it is known, and that was discovered by Mr. Reinwardt in the Indian seas. The upper jaw is divided, as in some other species of this genus. It is altogether one of the most singular-looking creatures that can be imagined, and learned men are puzzled to ascertain the use of some of its members." There are no measurements given of the creature as a whole, or of any of its parts. Perhaps this could not be expected in a book for children, but the description seems vague enough. However, perhaps some one may be able to tell me if the Triodon has really any existence in fact. The sketch enclosed is copied from the engraving in the book.—*J. M. C.*

Reply.—The account of Triodon is substantially correct. The fish attains to a length of about two feet; but it is not by any means certain whether it has the power of inflating itself, like other members of the order to which it belongs. The figure said to be the Triodon is quite a different fish, viz., a kind of shark (*Callorhynchus*). The case is analogous to one, if a man would describe correctly a camel, and illustrate his description with the figure of an elephant.—*A. G.*

Bees.—To the questions proposed in the August and September numbers of Science-Gossip in reference to bees, which I have just noticed, permit me to say that the case of the servant girl as adduced by J. L. Phelps is a very common one, for bees in swarming are under such excitement that their whole attention is centred in that one great undertaking; they are heedless of anything short of actual personal violence, and seem utterly to forget to sting. Moreover, as observed by "D. D. B.," prior to swarming they fill themselves with honey

for the first office in their new abode—comb-building; and a bee when gorged with sweets of any kind is never disposed to attack. It is by thus absorbing their attention, or directing it exclusively to one object, that a bee master is enabled to exercise unlimited control at any time over his little subjects, especially in a bar-hive. I can make my bees in a few minutes as harmless as peas, and handle them with bare hands as if they were so many black currants, and this without any anæsthetic means whatever. Again, sticks are useful in a hive only as a support to the combs in excessively hot weather, or in transferring a hive to keep the combs steady, but they are rather a hindrance to the bees, and grievously annoying to the honey taker in cutting out the comb, as the dragging them through tears the cells, and causes the honey to run vexatiously about. In reply to "F. S.," the queen bee has merely taken possession of the cup or super for breeding purposes (also a common case, but may be prevented as suggested by "D. D. B."), but "F. S." must be careful in removing it lest he lose her ladyship. The better plan would be to remove such super *temporarily*. If the bees in the stock hive after a short time exhibit symptoms of restlessness or confusion, and those in the cap are at ease, the queen is in the cap and it must be replaced forthwith, and the experiment renewed at another time. If, on the contrary, the bees readily leave the cup, it need not be returned at all. The same remarks apply to the glass. In answer to "D. D. B.," permit me to add that there are no hybrid drones—they are either all ligurian or all black, those produced by a bastardised ligurian queen being invariably ligurian. An unimpregnated queen of either species lays only drone and eggs, like a semi-developed worker, and fecundates alone; at the time of its deposit appears to convert the drone egg to a worker egg, and the treatment alone of the worker worm seems to affect its capacity for future impregnation: the first depending (possibly) on the *will* of the queen, the second on that of the little nurse bee. This, therefore, is hardly perhaps a case analogous to that of the crossing of what are termed distinct species, though even these *in domesticity* do sometimes produce offspring prolific *inter se*. Query, are these bees distinct species at all?—*J. W. Stroud, Plymouth.*

The Holly-tree.—The disciples of Zoroaster believe that the sun never shadows the holly-tree. There are still some followers of this king of the Magi to be found in the wilds of Persia, and some parts of India, who, when a child is born, throw in its face water which has been put in the bark of a holly-tree.—*Sylva Florifera.*

The Ivy.—At the marriage ceremonies of the Greeks, when the young couple arrived at the temple, the priest presented them with a bunch of ivy, symbolical of the tie which should unite them, and the omission of which at the wedding of Proserpine was said to cause the Cocytus to flow only with waves of tears.—*Sylva Florifera.*

Popular Description.—The other day I was visiting the Zoological Gardens, Regent's Park, and I heard, when in the Aquarium House, an old gentleman give an amusing character to some sea-anemones there. "You see," he said, "what curious animals they are, between a vegetable and a fish, half and half, and they are always in the same place, fixed for life, and they can't move, and yet they are alive. Wonderful!"—*W. K.*

Food for Bullfinches.—Having kept a Bullfinch in perfect health and plumage for six years, perhaps my experience with regard to his treatment may be of some service. His daily food is rape and canary seed, the proportion being about one-fourth only of the former; occasionally a little millet, and very rarely a hemp-seed or two, given as a treat. It is absolutely necessary to be very particular about the cleanliness of the cage, especially the perches, as Bullfinches are subject to diseased feet, and a bath two or three times a week is greatly conducive to their health; also a constant supply of groundsel, chickweed, or apple paring, and a thistle-head gone to seed, or a few ripe haws, will be much appreciated.—*C. E. F., Redland, Bristol.*

Food for Bullfinches (p. 215).—Bechstein, in his admirable work on "Chamber Birds," treating of bullfinches, says, "That they remain most healthy and live longest when they have neither sugar nor pastry, nor other delicacies given to them, but are fed constantly upon rape-seed, intermixed occasionally, by way of treat, with hemp, and occasionally a little green food, such as water-cresses, a bit of apple, berries of the service-tree, or salad, which cleanses their stomachs. That they are more healthy also if they have some water and sand placed in the cage, that they may pick up grains, to assist in the process of digestion;" and he recommends, as a remedy for "moulting," a rusty nail placed in the drinking-vessel, good food, and ants' eggs, if accustomed to the latter when young.—*J. R. Eldridge.*

Bullfinches.—I think that management has more to do with L. C. Whelan's bullfinches than food. I brought up from the nest this year a pair which (from the time they eat seed) had *rape*-seed for the first few weeks soaked. One had a deformity in its neck and died, but the other is very healthy and beautifully feathered, and *now* has the usual mixture of canary, rape, and a few hemp seeds with the other birds.—*W. D. R.*

Cockroach Eggs.—Have any of your correspondents ever been favoured with a view of the Cockroach in the act of laying its egg? The size of the egg is, as nearly as I can describe it, $\frac{3}{8}$ to $\frac{7}{8}$ of an inch long, and $\frac{1}{8}$ in diameter, with parallel sides, circular at each end, in section circular, with a well-defined ridge in one part from end to end; and this ridge, when the egg is laid, is quite perpendicular to the body of the Cockroach, instead of being, as I should have supposed, at one side or the other. Some one knowing the anatomy of the Cockroach better than I may be able to favour me with a reason. I may say that I was able to catch the insect at the time with the greatest ease with my fingers; it did not avoid me, as they usually do.—*Robert T. Andrews, Hertford.*

Carpels of Geranium (p. 211).—Will Mr. Williams give the name of the *Geranium*, the "persistent stigmas" (!) of which behave in the remarkable manner recorded in your last? Before writing my paper on "Cranesbills" I carefully examined nearly all our British species, and I have since inspected those in the herbaceous ground at Kew, but have failed to detect a single instance of the "spiral twisting" to which he refers. Such a circumstance must, I imagine, be somewhat rare in *Geranium;* inasmuch as one of the distinguishing marks by which *Erodium* is determined is this "spiral twisting," which is stated to be wanting in

the former genus. As in many cases the seeds are tilted out by the curling up of the awn, the carpel still remaining attached to the axis some time after the seed has fallen; and as, even when carpel and seed fall off at the same time, they usually separate before or on reaching the ground, I can but imagine that Mr. Williams has confused *Erodium* with *Geranium*, or that he has met with an exceptional and very remarkable phenomenon in some member of the latter genus. The rarity of such an occurrence as that he describes—if it ever takes place—may account for its omission by "botanical writers," as well as by myself. I may add, however, that Withering and other authors describe very minutely the phenomena connected with the carpels of *Erodium*.—*J. Britten, Royal Herbarium, Kew, W.*

Anacharis Alsinastrum.—One of the most common, yet at the same time one of the most wonderful sights, seen with the aid of the microscope, is undoubtedly the cyclosis, or rotation in the leaf-cells of this pretty aquatic plant. The following therefore may prove interesting information: I spent some time during the spring of the year over this plant with the object of discovering the number of cells in each leaf, the number of chlorophyll granules in each cell, and therefore the number of chlorophyll granules in each leaf. I examined twelve leaves from one plant with these results:—

1. Leaves examined averaged in size $\frac{24}{100}$ of an inch in length, and $\frac{7}{100}$ of an inch in breadth.
2. Averaged 9,100 cells to each leaf.
3. 20 average cells examined in each leaf, averaged 23 chlorophyll granules to each cell.
4. Average of leaves examined show therefore 209,300 chlorophyll granules to each leaf.

At another time I examined six leaves from another plant, with slightly varying results:—

1. $\frac{22}{100}$ of an inch by $\frac{6}{100}$ of an inch.
2. 9,750 cells to each leaf.
3. 22 granules to each cell.
4. 214,500 chlorophyll granules to each leaf.

The above are simply approximate calculations, yet the two results bear a fair comparison. All who know this plant are well aware what a varied appearance the cells and cell contents assume under different conditions, at different stages of growth, and at different seasons of the year. These observations were made upon very healthy plants, which have been growing in my aquarium for two years or more.—*Thomas Simson, Upper Lewisham Road, S.E.*

Economic Lamp-shade.—A cheap porcelain shade for microscopic lamps, designed by Mr. H. F. Hailes, and exhibited by him some time since at the Quekett Club, can now be had at Mr. Baker's, in High Holborn, for about a shilling. We have used it, and consider it a decided acquisition. The price too brings it within the reach of everybody, and everybody should have it.

Cats and Starfish.—Mr. Field may be interested in reading what has come under my notice about "Cats and Starfish." A neighbour of ours whose young chickens were continually eaten, and his garden scratched by cats, *fried pieces*—about two inches square—of *starfish in fat*, and threw them over his garden. The cats ate it and died, some at once, others on their instant return home. In every case that he examined, the throat was swollen, as if the deadly morsel still stuck in it; the eyes also were open. Sometimes the cats were stretched out as cats like to do in front of a fire, other times curled round as if asleep. Our neighbour many times during the shrimp seasons has given Starfish *thus* prepared to cats.—*A. Y.*

Fruit and Flower Gatherer.—We have received from Messrs Dick Radcliffe & Co. a flower-scissors called the "Selby flower and fruit gatherer," which in cutting seizes the stem and holds it firmly until purposely released: also a "new charcoal flower-pot" made of charcoal, moulded of the desired form.

Insect Trap.—Can any one give information respecting the following method of catching insects, mentioned by Kirby? He speaks of the late ingenious Mr. Paul, of Starston in Norfolk, well known as the inventor of a machine to entrap the turnip beetle, which (adds Kirby) may be applied by collectors with great advantage to general purposes (*Introd. to Entom.*, ed. 1857). Perhaps some Norfolk correspondent may be able to rescue the above form of trap from oblivion.—*W. W. S.*

Ladybird, Ladybird, fly away Home.

"The hops are in danger of perishing, and the ladybirds come to the rescue. Millions of these red-cased, black-spotted insects have suddenly made their appearance in Kent and Sussex, and have even extended their flight to the metropolis. . . . . In some places it has been impossible to walk without crushing numbers of these diminutive creatures to death."—*Standard.*

I would I were a bird,
A ladybird so wee!
No; I should look absurd
Among all fowls that be!

Besides, how vain in print
A transient fame to steal,
If doomed to die by dint
Of some plebeian heel!

No; in some other shape
I'll gain the public eye,
And while men, wondering, gape,
Through twenty columns fly:

Oh, yes! I'll be a four-
legged chicken, two-legged flea,
Huge hailstone, mushroom, or
Enormous gooseberry.—*Fun.*

An Electrical Insect.—You are well acquainted with the history and properties of the *Raia torpedo* and *Gymnotus electricus;* but I dare aver have no idea, that any insect possesses their extraordinary powers; yet I can assure you upon good authority, that *Reduvius serratus*, commonly known in the West Indies by the name of "the wheel bug," can, like them, communicate an electric shock to the person whose flesh it touches. The late Major-General Davis, of the Royal Artillery, well known as a most accurate observer of nature, and an indefatigable collector of her treasures, as well as a most admirable painter of them, once informed me that when abroad having taken up this animal and placed it upon his hand, it gave him a considerable shock, as if from an electric jar, with its legs, which he felt as high as his shoulders; and dropping the creature, he observed six marks upon his hand, where the six feet had stood.—*Kirby's Introduction.*

NOTICES TO CORRESPONDENTS.

G. E. C., J. W., S. J., and B. T.—Books are ineligible for notice in our exchange column.

L. R. R.—The plant is *Corydalis claviculata*.

G. C.—The caterpillar is that of *Chærocampa celerio*.

W. B. L.—Newman's "British Moths."

J. P.—The mycelium of a fungus. It is often more or less phosphorescent; boys call it "touchwood," and know of its luminous property.

M. F. D.—Eggs of the lace-wing fly (*Chrysopa*).

C. W.—See notice of Elm-galls in Science-Gossip for 1867, p. 17. They are produced by aphides.

H. C. S.—Write to Mr. W. R. Tate, Grove House, Hackney, and he will render any assistance.

J. R.—It is the bog pimpernel.

C. S. G.—The puss-moth (*Cerura vinula*).

F. H.—The swarms of ladybirds have been so fully noticed in all the newspapers, that it is unnecessary for us to enter upon the subject.

A. T. B.—"Sowerby's English Botany," 3rd edition, vol. ii., p. 137.

H. E. W.—Undoubtedly we should consider "pepsine" free from the conditions necessary for trichini.

D. G. W.—There is not likely to be a new edition of the lectures you name. The book "Life on the Globe," by Professor Phillips, we do not know. There is one with that title by David Page.

H. W. H. C.—No. 1 is *Gemellaria loricata*. 2. *Crisia eburnea*. 3. *Canda reptans*.

W. K.—We should recommend you to purchase a storm-glass, rather than "dabble" in making them; especially as makers will take care not to tell everything that is essential to success.

W. H. L.—For particulars of fly-mould (*Sporendonema muscæ*), see the first number of Science-Gossip, 1865, p. 11.

J. D.—Dr. Ormerod's "Natural History of British Social Wasps," was published in 1868 by Longmans & Co., we think at half-a-guinea.

R. A.—Don't use so much balsam. Try a single drop on a slide, then place the "Aregma" on the balsam, in the centre; in a short time put on the cover. We have mounted hundreds of slides of rusts without the least difficulty.

J. H.—We have no such intention; nor do we intend pledging ourselves to any special course for the future, except to do the best we can for *all* our readers.

J. R. E. had better address his query to a special Horticultural journal.

A. C.—The larva of either *Agrotis exclamationis* or *Agrotis segetum*.—*H. G. K.*

E. T. S.—The spider and egg cocoon are of the species *Theridion pallens*, Bl.—*O. P. C.*

D. H. S. (Worthing).—The specimen sent was composed of the confervoid filaments of a moss in their resting state in dry weather; on the approach of winter and spring they alter their character, and become green as they grow; a full account may be found in a paper by Dr. J. Braxton Hicks in *Linn. Trans.* for 1862.

R. H.—No 1. *Triglochin palustre*, L. 2. *Listera ovata*, R.Br. —*B.*

H. W. G.—No. 1. *Erigeron Canadensis*, L. The flower heads are *never* yellow strictly speaking. 2 and 3. Not uncommon. 4. *Oplismenus* (Echinochloa) *crus galli*, or *frumentaceus*, K.—*B.*

F. G. S.—The "Richmond and North Riding Naturalists' Field Club" is in active operation under its excellent president, Edward Wood, Esq., of Richmond.

T. Buck (Chelmsford).—It is impossible, without actual experience, to answer your question. It would certainly be best to keep the eggs moderately damp—say in moss. The larva is stated to be full grown in April, so it probably hatches late in the summer or autumn. Young larvæ may be seen quite early in the spring; these have, doubtless, hybernated. You are, of course, aware that the glowworm, both as a larva and perfect insect, is carnivorous, feeding on snails and other mollusca. In Science Gossip for 1868, p. 73, you will find an article on mounting, &c., *Coleoptera*, which will probably enable you to preserve "water insects" for examination. But you do not state *what* water insects.—*E. C. R.*

I. G. H.—The small beetle "abundant on the leaves of *Zizyphus rugosa* on the western ghauts of India," is *Platypria echidna*, Guérin, one of the *Hispidæ*.—*E. C. R.*

M. D. B. (Leamington).—Having had experience of the kind of rubbish you send as good slides in exchange, and—charitably believing that you know no better—we decline your offer to "Portland" with thanks.

St. E.—Mr. Wheldon, Great Queen Street, London, W.C., has a good supply of second-hand books on natural history.

J. C. D.—No. 1. *Thuidium tamariscinum*. 2. *Bartramia pomiformis*. 3. *Tortula muralis*.—*R. B.*

F. M. C.—The moss is *Bryum pseudotriquetrum*.—*R. B.*

J. D.—The bees sent are *Odynerus parietum* (male), and *Andrena fucata* (male).—*F. S.*

H. W. H. C.—No. 4 is *Lophocolea bidentata*.—*R. B.*

EXCHANGES.

Foraminiferous Sand.—Send stamped and addressed envelope (and any object of interest) to H. P., 12, Bedford Circus, Exeter.

Palmelloids Wanted.—Species of Protococcus or Palmoglæa (living if possible) for which postage will be repaid. D. H. Scott, 31, Spring Gardens, S.W.

Pyrola rotundifolia (var. *arenaria*), and a few other good British Plants (dried), for Cyperaceæ or other good plants.—Lists to J. H. Lewis, 180, Mill Street, Liverpool.

Rare British Birds' Eggs, in exchange for Foreign or other rare British Eggs.—W. F. Foottit, Newark, Nottinghamshire.

Alpine Plants for rare British Plants.—Send lists to T. A., Post-Office, Midleton, Co. Cork.

Porcupine Quill (section); Diatoms from Poona, India; Scales from *Elæagnus* (all mounted), offered for good mounted objects.—I. G. H., 152, Holland Road, Kensington, W.

British Lepidoptera in exchange for Foreign Shells, Fossils, or Minerals.—B. A., Post-office, Faversham.

Beautiful Crystals of Selenite, single and compound, for British Shells.—G. S. T., 58, Villa Road, Handsworth, Staffordshire.

Hair of Kangaroo, and pod of Cowage (*Mucuna pruriens*) for other unmounted material.—W. F. Haydon, 2, London Street, Norwich.

Eggs of Goldcrest, Grebe, Teal, Snipe, &c., *Reclusa pupæ*, *Elpenor imagos*, &c., for exchange.—Mrs. C. Battersby, Cromlyn, Rathowen, Co. West Meath, Ireland.

American Birds' Eggs.—Fourteen species (forty-six eggs) for British Eggs.—"Maine," care of Editor of Science-Gossip.

Sponge Spicules.—Twelve, or six, mounted slides, named species, for an equal number of good slides, except mixed Diatoms.—"C.," care of Editor of Science-Gossip.

Unmounted Wood Sections of thirty to forty English Plants will be given in exchange for mounted slides of fair character. Lists if required.—William Paling, Worksop.

Lepidoptera.—*C. Davus*, *C. solidaginis*, *N. plantaginis* in exchange for *C. hyale*, *L. Sibylla*, and *V. polychloros*, &c.—J. Noden, Spring Bank News-room, Stockport.

BOOKS RECEIVED.

"An Illustrated Natural History of British Moths; with life-size figures from nature of each species, and of the more striking varieties, &c.," by Edward Newman, F.L.S., F.Z.S., &c. 1 vol., Imp. 8vo., pp. 486. 1869. London: W. Tweedie, 337, Strand.

"The American Naturalist" for August, 1869. Salem: Peabody Academy of Science.

"Scientific Opinion." Part X. September, 1869. London: Wyman & Sons.

"Annual Report of the Board of Regents of the Smithsonian Institution for 1867." Washington, U.S.A.

"The Canadian Entomologist." Vol. II. No. 1. August, 1869. Edited by the Rev. C. J. S. Bethune, M.A. Toronto: Copp, Clark, & Co.

"Land and Water." Nos. 187, 188, 189, 190, 191.

"Gardener's Magazine." Part XLV. September, 1869.

"The Monthly Microscopical Journal." No. 9, September, 1869. London: Robert Hardwicke.

"Prodromus of a Study of North American Freshwater Algæ," by Dr. Horatio C. Wood, Jun., Professor of Botany University of Philadelphia.

"Catalogue of the Microscopical Section of the United States Army Medical Museum." Washington. 1867.

"Autumn Supplement to Hooper & Co.'s General Catalogue for 1869, containing Dutch, Cape, and other Flowering Bulbs."

"The 5, Bow Churchyard, Magazine." No. 5. September, 1869.

"Catalogue of Dutch Bulbs, Ferns, Seeds for Autumn Sowing, &c." Dick Radclyffe & Co., 129, High Holbern, W.C.

"Le Naturaliste Canadien." No. 9. August, 1869. Quebec.

Communications Received.—H. E. W.—A. G.—J. C. H. —R. McL.—E. T. S.—E. H. W.—J. R. (Yes).—R. N. B.—F. J. D. H.—C. S. G.—D. G. W.—H. C. S.—M. T. W.—F. H. —A. T. B.—T. B.—C. W.—J. O. H —S.—N. N.—M. F. D.—W. B. L.—R. G. McL.—J. P. F.—W. T.—P.—G. N.—R. G.—R. A.—L. B.—G. C.—F. M. C.—F. H.—H. P.—R. M. H.—H. M. G.—J. H. F.—W. B. L.—B. T.—J. O. H.—C. H.—A. L. —H. S.—D. H. S.—J. W. G.—J. T. N.—F. W. M.—T. S.—J. H. L.—L. R. R.—C. S.—F. S.—J. B.—W. G.—J. G. H.—L. L.—J. M. J.—J. H. — T. W. J. W.— O. T. W. H. E. W.—G. E. C.—W. F. F.—T. A.—J. M.—W. F. H.—G. B.—M. C. (Kent).—H. W. H. C.—W. H.—R. T. A.—C. E. F.—R. W.—T. S.—J. R.—W. P.—R. H.—C F. G.—J. R. E.—J. W.—J. G. H.—G. S. T.—H. W. G.—F. W. W.—W. H. L.—S. J.—W. K.—C. R. D.—J. H.—B. A.—D. H. S.—M. C. Ch.—J. D.—J. B.—A. G.—T. S.—C. B.—W. D. R.—C. D.—A. Y.—J. B. L.—J. W. W.—T. P. F.—St. E.—M. D. B. —R. B.—C. O. W.—J. N.—W. P.

ENGLISH NAMES OF BUTTERFLIES.

IT is to be feared that the majority of English botanists and entomologists, especially the latter, regard with great indifference the vernacular names of the plants and insects they make their study. Compelled themselves to use the Latin nomenclature (and this would be a matter of choice, no doubt, with a proportion, did not necessity lead them to it), they care little about a second set of names, burdensome to memory, and bearing little or no relation to the recognized scientific designations of the species before them. The entomologist, who finds few of the objects of his pursuit individualized by those with whom he has to converse in society, has less need even than the botanist to exchange the Latin name most familiar to him for one which would be intelligible to a person knowing nothing of Latin, and not much of science. "Good English names for insects are desirable, and helpful to juvenile learners of science," so argue some. If desirable, they are not easy to be got; and, owing to the multitude of species included in the class INSECTA, we suppose the time can never be looked for when an English name shall be attached to a tenth part of them. Such a nomenclature has been attempted in the order Lepidoptera, and Stephens' Museum Catalogue gives a muster-roll, which will variously excite the readers of it to laughter, to disgust, or to regret, according to the mood of their minds. These names are—at least the bulk of them—highly unsatisfactory to the entomologist, and much of what is amiss in them has been occasioned by the lack of any clear or well-understood rule as to the course to be pursued in applying such names. Hence we find, on examination, that a goodly number of these have been constructed, and applied to species, on principles scarcely sound. This was to be expected, considering that many were given by persons not learned in insect lore, and attached too hastily to the insect before its habits were sufficiently known. We take it, however, as a postulate, that this English name should, in nearly all cases, have a direct reference to some well-marked characteristic of the species, either in appearance or in habits. We say in nearly all cases, because there are instances where it may be a graceful act to name a species after some individual, or where a restricted locality is so manifestly associated with a species (as in the case of the Lulworth Skipper), that there is an appropriateness in connecting the two thereafter. Otherwise we should wish to sweep away, were it possible, a host of names derived, it may be, from some trivial incident connected with the first capture of the insect; from a place which was only one resort of a species, or merely a conjectured one; or from a food-plant which was doubtful, or, at any rate, occasional. A revision of these partially accepted English names given to our LEPIDOPTERA would present great difficulties; but with regard to the small section comprising our butterflies, we might surely select the best where more than one have been applied to a species, or even alter an inappropriate one. The time may not be very far distant when these sixty-five species and their habits will be as well known to the schoolboy as the commoner quadrupeds are now, and in that case a simple and expressive English name would facilitate greatly the acquisition of this knowledge. May we venture, therefore, to suggest a possible improvement or two, without at all intending to imply that we have authority to speak *ex cathedrâ*.

The Black-veined White (*P. Cratægi*) has also been called the Hawthorn Butterfly from the food of the larva. The former of these names is expressive,

and more generally in use, and should be retained. A very rare British butterfly is designated in older authors the Bath White (*P. Daplidice*), but Newman's name, the Green-chequered White, is preferable. That charming little species, the Orange Tip (*A. Cardamines*), may well continue to carry that English name; it has been called the Wood Lady, but there is no particular applicability in the term, which has also been given by some writers to *S. Ægeria*, and might also apply to the Wood White (*S. Sinapis*), another lover of the woodland glades. For the two closely-allied species, known scientifically as *C. Edusa* and *C. Hyale*, we cannot keep to better names than the Clouded Yellow and the Pale Clouded Yellow; the first has been called the Clouded Saffron, and the second the Clouded Sulphur; but as sulphur varies in colour, and we have already a "Brimstone" butterfly, we dismiss the latter name, nor has the former any particular recommendation.

Coming to the Fritillaries, we must let pass the time-honoured Queen of Spain, though its history is doubtful, and the butterfly, rare as it is, has nothing royal about it. We have two of the smaller Fritillaries very nearly similar,—the Pearl-bordered Fritillary (*A. Euphrosyne*) and the Small Pearl-bordered (*A. Selene*), being only distinguished by some additional silvery spots in the latter species, and a slight difference in tint. In size they are almost identical. In this case it is not easy to amend the name; but *Euphrosyne*, being by far the most abundant in woodlands generally, might be called the "Common Pearl-bordered," and *Selene* simply the Pearl-bordered. Or the latter species might, instead of "Small," bear the adjective "Lesser," as there is a very trifling difference in size. To another Fritillary (*M. Athalia*) certain authors give the singular name of the Pearl-bordered Likeness; Newman calls it the Heath Fritillary, an appropriate appellation, as the species loves heaths, and woods lying contiguous thereto. Of the Greasy Fritillary (*M. Artemis*) it may be said that the name is not an agreeable one to the entomologist; grease in any form, being decidedly disliked by him, as marring the beauties of his cabinet; and, indeed, to be correct, this species should be called the "Seemingly Greasy," for the appearance it presents on the under side is not due to grease at all. As it has also been called the Marsh Fritillary, from its occurrence in marshy meadows, the adoption of this name would be advantageous. To a small butterfly, not allied to the true Fritillaries, yet resembling them in its markings, belongs the sonorous appellation of the "Duke of Burgundy"; and, with all respect to the illustrious dukes of that name, we think it scarcely desirable to continue to link it with a butterfly. This species might be called the Little Fritillary, or the Cowslip Fritillary, as the *larva*, in this country, feeds exclusively on that plant.

Amongst the *Vanessas* we have the brilliant *Atalanta*, called vernacularly the Red Admiral, or the Alderman, because it was supposed to be garbed similarly to those dignitaries when dressed on special occasions. Discarding this name, we fall back upon the first, which is obviously a corruption of the word "Admirable," because the species was indeed *valde admirari*. No points of resemblance can be traced between butterflies and admirals, to our thinking. (The same reasoning applies to a species belonging to a different genus—the White Admiral, or Admirable Butterfly.) For a relative of this butterfly (*V. Cardui*) we can hardly venture to propose the displacement of the name of "Painted Lady," long familiarized to us, if inappropriate; but it might have been called the "Thistle Butterfly," as the only British species whose *larva* is found upon that plant. *V. Antiopa* is known as the "Camberwell Beauty," the "White Border," and the "Grand Surprise." We demur to the connection being perpetuated between this fine insect and a London suburb, where, for a short time, it appeared pretty numerously. There is little objection to the name "Grand Surprise"; for from its rarity the collector in this land will always be surprised if he sees it, and still more so if he catches it. Amongst the *Satyridæ* we have some singular names. *Cassiope*, a species occurring in the North of England and Scotland, has been called the "Little Ringlet" and the "Mountain Ringlet": the latter should perhaps be adhered to, as another species has been sometimes called by authors the "Small Ringlet." An elegant allied species (*S. Ægeria*) is known variously as the "Speckled Wood," the "Wood Argus," and the "Wood Lady." We feel inclined to give the preference to the middle name; though it must be admitted that the first is most generally in use. Another kindred species is known as the Wall or the Speckled Wall (*S. Megæra*), from its habits of pitching on walls and palings,—a reason which would not at once strike the ordinary observer. That common butterfly (*S. Tithonus*) has three English names,—the "Small Meadow Brown," the "Large Heath," and the "Gatekeeper." The last, being a little absurd, may at once be rejected; and, between the two remaining, we should decide upon the "Large Heath" as very applicable, and more generally used. The "Small Heath" (*S. pamphilus*) has been called the "Least Meadow Brown" by one or two authors; but it is, more even than *Tithonus*, a butterfly partial to heaths and commons; and we may as well leave *Janira*, the homely flutterer of our fields, the undisputed ownership of the name "Meadow Brown." The elegant butterfly, known in science as *S. Semele*, is very commonly called also the "Grayling," a rather inappropriate appellation, while a less frequent name is the "Rock-eyed Underwing."

The under surface of the hind wings is beautifully marked with streaks and bars, reminding one of those to be found engraven on some kinds of stone; but they are not "eyes" to our eyes. Could we call it the "Rock-marked Underwing"? a rather long name certainly, but expressive Lastly, in this family we mention *C. Davus*, the "Marsh Ringlet," or the "Little Ringlet." The first name is appropriate and definite.

Amongst our blues we find that *L. Argiolus* is known most generally as the "Azure Blue," though less azure in colour than some of the other species. It has been proposed to call it the "Holly Blue"; but the *larva* is found also upon the ivy, as well as upon the holly bloom, and possibly feeds also on the flowers of the buckthorn. As this is almost the only blue butterfly which frequents woods, it might be called the "Wood Blue"; yet, on the whole, it may be as well to adhere to the first name. We cannot see why the town of Bedford, worthy as its inhabitants may be, should still be associated with *L. Alsus*, a little butterfly occurring in numerous places throughout the United Kingdom. Of its two English names we take "Little Blue" instead of Bedford Blue. Another small but brilliant blue butterfly (*L. Adonis*) bears three vernacular names, viz., the "Adonis Blue," the "Cliefden Blue," and the "Dartford Blue." Were either of the localities to distinguish it henceforth exclusively, some reasons might be adduced in favour of Dartford, but, on the whole, we think the first, as generally in use, though a mere echo of the Latin, the beauty of the species giving it some claim to a classical appellation expressive of a charming appearance. A butterfly classed with the blues, though not itself exhibiting that colour, is the Brown Argus (*L. Agestis*); and it is to be regretted that the name "Argus," which has been applied to butterflies in a very different family, should have been used here, though in a measure correct, as this species bears a border of spots. The "Small Orange-spotted Brown" has been suggested; but is too long, and the other name is in too general use to be discarded.

Among the Skippers, which close our butterfly list, we need only refer to two. *H. Paniscus*, known generally as the "Chequered Skipper," has also been called the "Spotted Skipper." The first may be adhered to, as of long standing, though other species besides this are chequered. *H. Comma* some authors call the "Pearl Skipper," others the "Silver-spotted." As the spots are scarcely silvery in appearance, we incline to the former of the two names, though the matter is nicely balanced.

J. R. S. C.

MICROSCOPICAL MANIPULATION.—Mr. Suffolk's Lectures to members of the Quekett Club are being published in consecutive numbers of the *Chemical News*.

PSEUDOSCORPIONS.*

IN my searches into dark and damp crannies in heaps of rubbish after those remarkable insects the Poduræ, concerning which much interest has of late been excited, I have often disturbed Pseudoscorpions, and I have felt no small curiosity to learn something about them. From books within my reach, I have gleaned but little information, and so have been obliged to watch them myself: consequently, the observations recorded below, extending over a period of about three years, need confirmation.

Pseudoscorpions breathe by means of tracheal tubes, which, starting from four spiracles on the under side of the anterior segments of the abdomen, go straight to the principal internal organs, with very few ramifications.

I am not able to state authoritatively what is the exterior distinction of sex, but have very strong reasons for thinking that the males may generally be distinguished at a glance from the females by their being more slender. More than this, however, I am almost certain that a papillous structure on the first segment of the abdomen, close to its junction with the cephalothorax, and more or less elevated above the surface, indicates the female. From this structure in summer the eggs are budded off, a process of which I shall have to speak presently.



Fig. 209. Curious object discharged at intervals from vulva of male (*Spermatozoa* at A in a mass).

In a similar position, the males possess a vulva, whence curious tubes, having at one end masses of spermatozoa, are discharged during the breeding season, viz., May to August. I suspect the female fecundates herself—it may be accidentally, by contact of the papillous structure I have alluded to, with the discharged spermatic tubes, or spermatozoa, these being scattered about in considerable abundance and favourably situated for the purpose.†

I make this suggestion with some diffidence, since the opinion has only lately been formed, after a long period of doubt: indeed, I should hardly have dared to mention it at all if Sir John Lubbock, whom I questioned by letter on the subject, had

* Supplementary to a paper read at the Quekett Microscopical Club.

† This observation was made on *Obisium orthodactylum*. Chelifers have not been so numerous with me as to enable me to speak so confidently on the subject.

not admitted its plausibility. It appears that M. Fabre records a somewhat analogous case. Sir John Lubbock, in his courteous letter to me, says: "Fabre, in a memoir on myriapods in the 'Annales des Sciences Naturelles,' about ten or fifteen years ago, stated that in a species observed by him, the male spins a nest of silk and deposits a drop of semen in it. He also suspected that the female comes and impregnates herself."

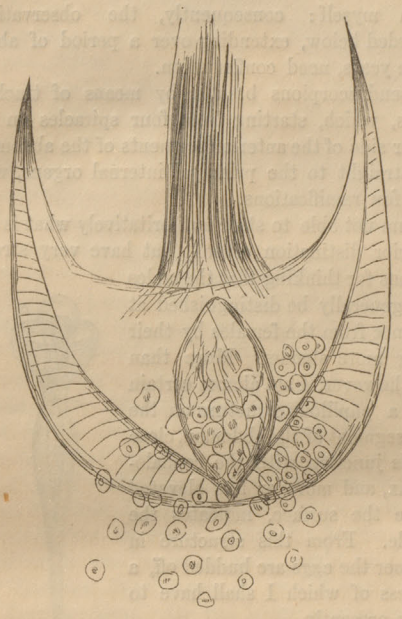


Fig. 210. *Obisium spermatozoa.* End of spermatic tube after desiccation, × 500.

I have many times seen the supposed male discharging these tubes from the vulva, and have satisfied myself that the globular object at one end (fig. 209) consists mainly of spermatozoa. Also, I have noticed the supposed females scratching the papillous structure alluded to above, and its vicinity, where there appears to be at this time a fluid secretion (especially in the groove between the legs), with their hind feet.

As the spermatic tubes do not retain their shape for many hours after extrusion, and the spermatozoa are scattered in the neighbourhood when the tube collapses, the hypothesis seems to me very probable (fig. 210).

I have patiently watched for some amiable traits in the character of these creatures, but the results I have obtained are so small that I must conclude I have watched in vain. Connubial felicity, so far as my experience goes, is unknown among them: no two individuals ever meet without threatening to eat each other up—not a vain threat either, for it often comes to pass that the weaker is sucked dry, and its remains are then cast aside by the stronger.

Maternal affection does seem to exist, at least for a time, for after the young have disengaged themselves from the egg (containing twelve to seventeen) they mount on their mother's back, after the manner of true scorpions, forming a very pretty study, since they cover her up entirely, while she sits apparently ready to defend them. The egg in which they are contained is attached to the papillous structure above mentioned, by a tube conveying nutriment from the abdomen of the parent to the embryo young, till they are fit to commence an independent existence, and is divided into as many compartments as there are young chelifers.*



Fig. 211. Female *Chelifer Latreillei* in pregnant state, × 15.

This observation may be confirmed by those who have the opportunity during the summer months.

In Sir John Lubbock's paper "on the Generative Organs and Formation of the Egg in the Annulosa" (Phil. Transac. 1861, page 617), are some suggestions which, coming from one so skilled in microscopic dissections, and so eminent in knowledge, are of great importance and weight. He thinks that there are with Chelifers two sorts of females, namely, those producing in the summer broods of eighteen or thereabouts by a budding process, as described above, and those which he suspects lay thirty-five to forty eggs in a secure place during the winter time, to hatch in the spring.

As Pseudoscorpions carefully conceal themselves in the winter time, this observation is not easily verified. The behaviour of all the healthy specimens that I have succeeded in keeping through the winter in confinement has been the same. They spin themselves a kind of silken cocoon† and hybernate in it. The shape of this cocoon or nest varies according to the situation chosen for it. Generally it is oval, and gives room enough for the occupant to turn round. It is fixed, and one or two

* This refers to two specimens of *Chelifer Latreillei*; the one with a brood of twelve, the other of seventeen young ones.

† Obisia are rarely observed to spin webs. One lately, however, spun a very complete web in one of my cells.

apertures are left to enable the owner to take a little walk out on fine days when the weather is particularly mild. I have known them to make mistakes in returning home, so that one cell was occupied by two Chelifers, more than once. In this case both seemed equally angry, but there was no space for a fair fight, and so they contented themselves by making each other uncomfortable, till they got used to it. Each seemed to wonder what business the other had there, but neither was disposed to seek shelter anywhere else.

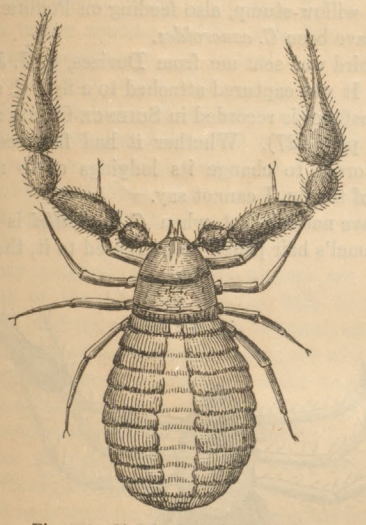


Fig. 212. *Chelifer Latreillei*, × 15.

I said above that Pseudoscorpions are most unamiable, though intensely interesting creatures. In the presence of their enemies they are arrant cowards, and will run away backwards with surprising celerity, or feign death, as it may seem to them most expedient. In the presence of one another, if there is plenty of room, they are pugnatious to the last degree. Each displays his boldest front and all his weapons, no gesture which may add to the effect, such as clashing the nippers together violently, advancing and then retreating, being omitted. Their blind rage on these occasions is funny to witness; I have seen them (Chelifers) pinching their own claws because they could not get hold of their antagonists. In the presence of their prey, however, their cruel ferocity comes out most forcibly. If in good health and of considerable size, they will kill far more than they can eat. Their proper food consists of Poduræ, especially Lepidocyrti, I believe. Of these I have known a single *Chelifer Latreillei*,* when first put into a cell, to kill all the inhabitants, numbering a dozen or so in a few days, their mangled remains testifying to the manner of their deaths,—vivisection in fact. Some four or five were eaten, or rather sucked, and each was carried about in the mandibles of the tyrant till it was nothing but a shell, just as a cat carries about an unlucky mouse. Obisium being smaller, has a less exacting appetite; but taking this into consideration, its disposition is just as bad as its cousin's.

* *Chelifer Latreillei* seems to be fond of *Lepidocyrtus curvicollis* (see SCIENCE-GOSSIP, 1867, page 55, fig. 39), while *Obisium orthodactylum* seems to be equally partial to the White Podura (*Templetonia nitida*. S. G., 1867, page 57, fig. 46).



Fig. 213. Parasite of *Obisium*. Ventral aspect after death, × 100; A, end of rostrum.

After such a bad character, the reader will be glad to learn that a certain member of the order (*Obisium orthodactylum*) is tormented by curious parasitic mites, which are, I believe, new to science.* I give a representation of them (fig. 213): they crawl over the back and legs, clinging with great tenacity to any part, and probably can pierce the host's skin for nutriment. One is about the same size as a grain of mallow pollen. The dorsal aspect is something like that of a tortoise, there being a sort of chitonous shield over the mite's back, establishing a curious resemblance. It has eight legs, the two anterior pairs being much longer than the rest, and the mouth I suppose to be suctorial. I cannot see any mandibles, but the rostrum, which terminates in two setæ (lancets?), is prominent and apparently formed for piercing.

The other is considerably larger. Its general appearance is much the same; but its legs are of equal length, and there are other points of difference which the figures will explain sufficiently for present purposes.

But "Where are these Pseudoscorpions, &c., to be found, and how shall we distinguish them?" does some one ask.

The order Pseudoscorpions is divided into two genera, Chelifer and Obisium, of both of which several species are known to be inhabitants of Britain.

Chelifers and Obisia are all furnished with long lobster-like nippers and powerful mandibles or fal-

* I have noticed two distinct species.

ces, very much like those of the tropical spider *Galeodes*.* The mouth is beneath these, and a formidable sucking apparatus it is. The nippers are furnished with several long hairs, which seem to answer the same purpose as the whiskers in the Felidæ, for they are sensitive to touch in a high degree. As it is necessary to keep these clean in order to ensure their utility, the Pseudoscorpion is continually passing them through the mandibles, where there is a comb-like structure, and sometimes two, eminently calculated to fulfil that purpose. The feet are furnished with tenent hairs (figs. 217, 218). In colour there is much variety, but chestnut-brown tints prevail in all the species.



Fig. 214. Hairs from a *Chelifer*, × 250 (from Theale).

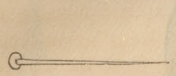


Fig. 215. Hair of *Chelifer*, × 100 (from London).



Fig. 216. Hairs from falces of *Obisium*, × 100.

Chelifers have two eyes, and the cephalothorax is divided by a cross-groove. The abdomen is generally flattened out somewhat like that of the bed bug, consists of rings, and is not nearly so well defended by chitonous armour as the cephalothorax.

Obisia have four eyes and the cephalothorax is entire. The abdomen is more cylindrical than that of Chelifer, and the rings are not so conspicuous. The nippers are long, and in most cases, but not in all, slender, and the



Fig. 217. Foot of *Obisium*, × 100, with tenent hairs.



Fig. 218. Foot of *Chelifer*, × 100.

chitonous envelope, in no place remarkably strong, is noticeably thicker all down the back than elsewhere.

* The Rev. J. G. Wood compares them to scorpions, minus the tail: a very good comparison.

Five species of Chelifers have been brought under my notice. The first of these was found in considerable abundance in a brewery at Theale, Berks, by F. Blatch, Esq., inhabiting the dark corners of the ale-store. It is, I think, *C. Latreillei*, but I am not sure. The colour, as with most of these creatures, is reddish-brown, and the margins of the abdominal segments on the dorsal surface are ornamented with very curious compound bristles. It fed on Poduræ (fig. 212).

Another species was found by the same friend in an old willow-stump, also feeding on Poduræ. This may have been *C. cancroides*.

A third was sent me from Devizes, by J. J. Fox, Esq. It was captured attached to a fly. A similar circumstance is recorded in Science-Gossip already (1865, page 227). Whether it had fastened itself on in order to change its lodgings or to make a meal of the fly, I cannot say.

I have noticed that when *C. Latreillei* is angry, if a camel's hair pencil be presented to it, the brush

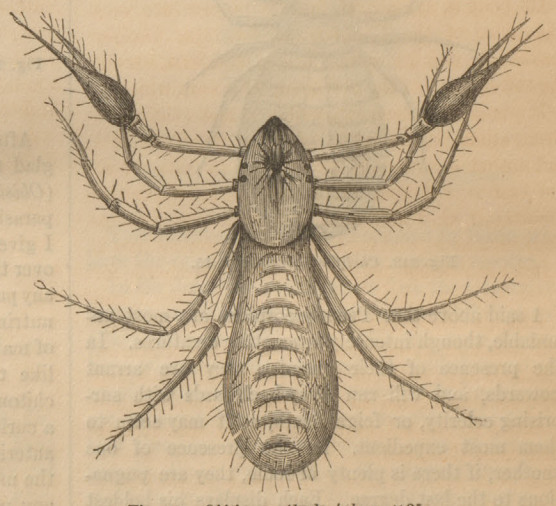


Fig. 219. *Obisium orthodactylum*, ×25.

will be readily seized, and the little fellow may be carried some distance ere he will let go.*

A fourth species I found under an earthern pan in London. It presented certain characteristics showing its relationship with Obisium, especially the marine species alluded to below. W. W. Reeves, F.R.M.S., on one occasion showed me several specimens of this kind that he obtained from a brewery at Deptford.

A fifth, a pretty little creature of bright sienna-colour, was sent me by R. T. Lewis, F.R.M.S. He found several individuals in a parcel of goods from the Continent.

* Mr. Fox also tells me he found nearly a hundred in an old cucumber frame on one occasion. Sir John Lubbock states that the specimens he examined were obtained from the vicinity of hotbeds in his kitchen garden.

Of Obisia I have seen three species: First there is *O. orthodactylum*, which is very abundant under stones, brickbats, &c., where there is considerable warmth and moisture, and also is of frequent occurrence in cellars under old woodwork (fig. 219).

Another species often accompanies this one, but I cannot name it. It has thicker and stronger mandibles, is broader across the cephalothorax, and is much darker in colour. Sometimes its back is of very dark brown hue.

A third, very large species is marine. It was sent me from Plymouth by C. Stewart, F.L.S., who found it rather abundantly fifty yards below high-water mark, feeding, to the best of his belief, on Poduræ and other soft-bodied creatures. In this situation it must be nearly always submerged; but doubtless the crannies of the rocks which it inhabits always contain a certain amount of air.

I hoped to have given a figure of this species, but so much space has been already occupied that I forbear.

Its body is cylindrical, but its nippers are very like those of the Chelifer (see fig. 212, *Chelifer Latreillei*), and its colour bright chestnut, except the softer parts of the abdomen, which are white.

It would have been impossible to make the above observations on the habits of these creatures if I had not made abundant use of the cork cells, which the reader will find described in the paper on Poduræ (S.-G., 1867), *sheet cork* of the best description, such as is used for lining entomological boxes, being substituted for *wood*, an improvement for which Dr. Gray, F.R.M.S., deserves the credit, and I strongly recommend them to all microscopists who desire to know the habits of minute creatures.

Should any reader of these imperfect notes find any pseudoscorpions and be unable to devote much attention to them, I need hardly say I will receive them most thankfully.

S. J. M'Intire.

TROPICAL CLIMBERS.

ONE of the most striking characteristics of a tropical forest is the almost incredible number of great woody climbers, which everywhere interrupt the view and obstruct the path. We of more temperate climes, who are apt at times to use some strong language when we are held back for a moment by a too familiar bramble, or are tripped up by a tenacious clematis, are little aware of the difficulties which beset the traveller in the dense forests of Central and South America. In Europe, it is the trees which give a character to the woods, and we look on the Ivy and the Honeysuckle, the Travellers' Joy, and the Bryony, as delicate fringes on the stout stems and branches of the trees; but not as an integral portion of the forest itself. The first only of the above-named occasionally attains such dimensions as to give a decided character to the surrounding vegetation. It is very different in the forests of Brazil, for example: there the attention is caught not more by the trees, huge and luxuriant though they are, than by the gigantic climbers, which twist and twine and struggle among their branches. The tallest trees are overtopped by them, and they hang down in graceful festoons, or thick cable-like masses, which wave to and fro in the wind. Some, as their points touch mother earth, take fresh root, and thickening by degrees, stand stiff and erect as though they had been tightened artificially; while others, entangled by the over-hanging boughs spread from side to side, interlacing one with another, and at last forming an impenetrable screen, behind which the jaguar lurks, or troops of monkeys sport, safe from the shot of the hunter. So strangely luxuriant is the growth of many, that their embrace is fatal to the tree to which they cling. One in particular, a kind of fig (known by the appropriate name of Matador, or Butcher), not merely strangles the host who has given it support, but as the latter decays, takes its place, and losing its character as a climber, stands a hollow self-supporting column, where once a tall Mahogany or Courbaril raised its head.

As may be supposed, these Liane (or Cipos as the Brazilians name them) form a very serious obstacle to the traveller. Many of them, though scarcely thicker than a stout string, require a knife, and a sharp one too; while others, stouter than a man's arm, must be attacked with the axe, before a passage can be forced. Some are furnished with perfectly smooth stems, but not a few, armed with stiff prickles and hooks of unpleasant proportions, make cruel work of the clothes and flesh of the unlucky wanderer.

Many of these huge webs of nature's own making are only so far ornamental as strange forms and gigantic festoons must always be striking and picturesque; such are species of *Pothos*, *Paullinia*, and *Aristolochia*; but the great bulk of them lend a wonderful magnificence to the scenery, by the extraordinary splendour and quantity of their flowers. Witness the great *Bignonias*, of which Prof. Lindley says, in his "Vegetable Kingdom": "The tropics of either hemisphere are the chief station of this noble-looking order, whose trumpet-shaped flowers, from their large size, gay colours, and great abundance, are the glory of the forests which they inhabit." Scarcely less conspicuous are the *Banisterias* and *Bauhinias*, with their gaudy yellow and red corollas.

Nor are they without their uses: from *Calamus Draco* we get the well-known dragon's blood, a dark-coloured insipid resin; to say nothing of the canes so much valued for their flinty hardness and flexible nature.

Paullinia too (*teste* Loudon) "affords a well-

known walking-stick." A more important fact is, that its various species abound in an acrid principle which can be employed as a deadly poison. The fruit of many of the *Passifloras* is highly esteemed. From *Urceola elastica*, which sometimes reaches to a length of four or five hundred feet in the islands of the Indian Ocean, is obtained a large proportion of the *caoutchouc* in use. Various species of *Smilax* supply the world with *Sarsaparilla*, while *Vanille*, so much employed in confectionery, is the produce of an orchid which may fairly rank among tropical climbers.

Havre. W. W. Spicer.

PODURÆ.

WITHOUT doubt many *Science-Gossipers* count among their treasures one or more cages of Poduræ or Cheyleti; but many may be puzzled, as I was, to know how to secure the former, and prevent them from springing away when found. The general advice is, "spread oatmeal on paper near their haunts, and when the Poduræ are attracted by it, secure them." Excellent in theory, but by no means easy to practise. If we bear in mind the well-known fact that no flea was ever so agile; also, that even, when they do quiet down for a rest, to pounce upon them with finger and thumb would cause instant death, it will at once be seen that it is no easy matter to catch these "wee beasties," and land them safely in the house prepared for their reception.

My *modus operandi* is simple and sure. A trap, consisting of bread-crumbs sprinkled on a sheet of white paper, is laid in a damp corner of the wine-cellar overnight. I should say that where they have not been disturbed for some time, Poduræ may generally be found in numbers on any bit of stick which has been lying on the cellar floor; but they have a decided objection to being disturbed, and if the reader possesses a voracious Cheyletus or two that evince a partiality for Poduræ for dinner, he will soon find that constant hunting to meet constant demands will cause them to be very chary of any wood or trap which is often looked at.

In the morning, if I have been successful, I carry paper, bread-crumbs, and "springtails" into the parlour, knock the Poduræ off with a sharp jerk, on to a white cloth, and, before they have time to recover their astonishment at such an unwonted procedure, I place a tumbler over them. As soon as they get quiet, I dip a small brush in chloroform or methylated spirit, and raising the edge of the glass, insert the brush, and damp the cloth with it, instantly withdrawing, and pressing the tumbler closely down. For a second or two the commotion is intense, leap after leap being executed with wondrous agility. In about ten seconds, but much longer if methylated spirit has been used, they fall motionless, their tails nearly always being stretched rigidly behind them. In this condition they can be easily placed in the cage.

Sometimes they remain under the influence for hours, but generally recover in from five to fifteen minutes. After a dose of chloroform, they, in three cases out of five, exhibit a peculiarity I do not remember to have seen noticed elsewhere. For some days they seem to lose all power of muscular contraction in the tail, and it is really amusing to see them walking about and feeding with their two-pronged appendage trailing after them.

I have one before me now which was captured four days since. It remained for nearly three hours in a state of torpor; since then it has been running about unable to double its tail under its body. As far as I have observed, only the younger members of my family are thus affected; the older and stronger ones recovering the use of all their members with their senses.

These tiny creatures are easily get-at-able, living as they do in almost every damp cellar, or garden-house, among the sawdust or decaying bits of wood. The delicate markings of many of the scales serve as test-objects. Under a low power, either by day or artificial light, the live Podura is a beautiful object. Its scales reflect the light in exquisite hues. As it moves along the cork sides of its house, the changing play of light and shade is very fine, especially when the tail is expanded from the effects of chloric ether; for its silvery appearance contrasts well with the more gorgeous scales of the body.

The tail, or spring, is usually doubled under the abdomen, and is of the same length. At the tip it is divided into two prongs. When the Podura wishes to spring, it slaps the tail forcibly on the ground, and thus jumps to an incredible distance.

They are not particular in their diet. Bread-crumbs, oatmeal, a grain of wheat or biscuit serving them equally well.

Where one is under the painful necessity of keeping show objects for exhibition, nothing is more sure of exciting interest. They are always at hand ready to be placed on the stage. For the living Podura only a low power can be used; therefore when self-confident, non-scientific friends who never can be persuaded that you can focus better than they, drop in for a microscopical (?) evening, you may place your cage on the stage, pretty well assured that neither objective nor object can sustain much damage. M. Pope.

Weymouth.

Bees.—P. 238, column 1, line 35, read: "An unimpregnated queen of either species lays only drone eggs, like a semi-developed worker. Fecundation alone, at the time of its deposit, appears to convert the drone egg to a worker egg," &c.—*J. W. S.*

LINA POPULI.

WHILE botanizing in this neighbourhood last June, I came across a number of larvæ feeding on poplar, not unlike the larvæ of the common Lady-bird, which I found to be gifted with a very curious method of defence. On each side of the body runs a series of papillæ, or wartlike excrescences, from each of which, when the animal is touched, issues a drop of a yellowish milky fluid; if the irritation is not continued, the drops as quickly disappear. So completely does the liquid retain its round form, and so entirely is it absorbed again, that it has all the appearance of a bladder, into which air is forced and again withdrawn, until a touch dissipates the illusion. But woe to the unlucky "searcher after truth," who gets his hand besmeared with this most abominable liquid; as Shaw long ago observed, "the odour imparted by it is of so penetrating a nature, that on handling the animal the smell will often remain on the fingers throughout the whole day."

The specimens which I took home doubled or trebled their size in a few days, and their colour changed to a nearly pure white, the papillæ alone remaining black. By the middle of July each larva had fixed itself by the tail end of the abdomen to the surface of a leaf, and there remained head downwards, with the body slightly curved inwards, gradually assuming a deep orange tint, as the elytra of the enclosed beetle took their proper form.

On the evening of the 25th, there issued forth the handsome beetle (*Lina populi*), one of the Chrysomelids.* At first the wings were of a dull brick-colour, and only assumed their rich red hue after an hour or two of exposure to the atmosphere. The perfect animal appears to be quite as destructive as its larva, being equally voracious, and devouring the same food; the only difference appears to be that the larva attacks the surface of the leaf, whereas the beetle confines itself to the edge.

Havre. W. W. SPICER.

THE AMERICAN SILKWORM.

By L. TROUVELOT.

THE insect fauna of North America contains several gigantic species of moths belonging to the Lepidopterous family Bombycidæ. This family has long been known to spin when in the larval, or caterpillar state, a cocoon which produces a large amount of silk, with a fibre of the most delicate texture, of great strength and of the most beautiful lustre. Every one is familiar with the beautiful and delicate fabric made from the fibres spun by that crawling repulsive creature, the Silkworm.

Our country alone has eight or ten species of Silkworms. Two of these, *Callosamia Promethea* and *C. angulifera*, feed on the lilac and wild cherry. They spin a small elongate cocoon of so very dense texture and so strongly gummed, that I have failed in all my attempts to reel the silk from the cocoon. These cocoons resemble very much those of *Samia Cynthia*, or the Ailanthus Silkworm, recently introduced into Europe from China, but the cocoon is of a looser texture. *Ptatysamia Euryale*, *P. Columbia*, and *P. Cecropia* feed upon many different species of plants; they make a large cocoon, within which is another cocoon, or inner layer, of an oval form; but as the larva in spinning the cocoon leaves one end open for the exit of the moth, this prevents the reeling of a continuous thread. The silk, though quite strong, has not much brilliancy, and the worm is too delicate to be raised in large numbers.

The caterpillar of *Tropæa Luna*, the magnificent green moth with the long tail-like expansion of the hind wings, feeds upon the oak, sycamore, and other trees, and spins an oval cocoon, which, however, is so frail and thin, and the fibre so weak, that it is impossible to reel it.

Practically, however, the larva of *Telea Polyphemus* is the only species that deserves attention. The cocoons of *Platysamia Cecropia* may be rendered of some commercial value, as the silk can be carded, but the chief objection, as stated above, is the difficulty of raising the larva. The Polyphemus worm spins a strong, dense, oval cocoon, which is closed at each end, while the silk has a very strong and glossy fibre.

For over six years I have been engaged in raising the Polyphemus worm, and here present the following imperfect sketch of the progress made from year to year in propagating and domesticating these insects from the wild stock.

In 1860, after having tested the qualities of the cocoons of the different species of American Silkworms, I endeavoured to accumulate a large number of the cocoons of the Polyphemus moth, for the future propagation of this species. At first the undertaking seemed very simple, but who will ever know the difficulties, the hardships, and discouragements which I encountered! This worm having never been cultivated, of course its habits were entirely unknown, though all success in my undertaking depended very much upon that knowledge. However, I was not discouraged by the difficulties of the task. The first year I found only two caterpillars. The chance of their being each a male and female was very small, and it was another question whether the two sexes would come out of the cocoon at about the same time for the fecundation of the eggs. So success was very doubtful. Spring came, and with it one of the perfect insects;

* The terminology of the Chrysomelids seems difficult to settle. The older authors placed many of them under Coccinella, to which they bear a strong family likeness. The poplar-feeding species oscillate between four genera: Linnæus placed them in Chrysomela, Megerle in Lina, Dillwyn in Melasoma, and Stephens in Timarcha.

it was a male. One, two, three days elapsed; my poor male was half dead, the wings half broken, the other cocoon was not giving any signs of an early appearance; imagine my anxiety; it was a year lost. The male died on the sixth day. The other moth came out more than a fortnight after; it was a male also. During the summer of 1861, I found a dozen worms, knowing then a little about their habits. In the spring of 1862, I was fortunate enough to have a pair of these insects that came out of the cocoon at the proper time, and I obtained from their union three hundred fecundated eggs. The pair which gave me these eggs were the originators of the large number which I have cultivated since. Of these three hundred worms, I lost a great many, not knowing their wants; but I succeeded in obtaining twenty cocoons in the autumn. It was only in 1865 that I became expert in cultivating them, and in that year not less than a million could be seen feeding in the open air upon bushes covered with a net; five acres of woodland were swarming with caterpillar life.

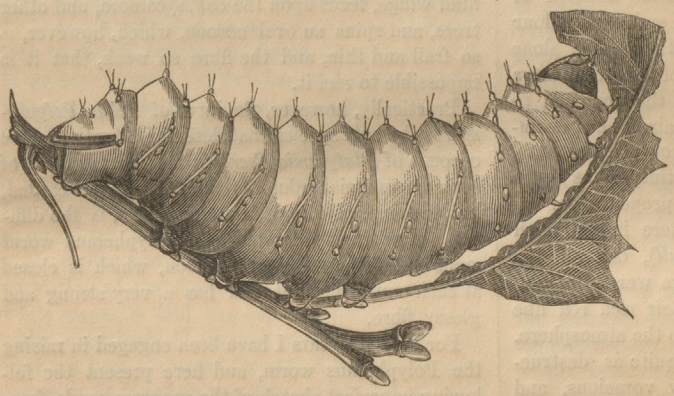


Fig. 220. Caterpillar of *Telea Polyphemus*.

Early in summer, the chrysalis of Polyphemus which has been for eight or nine months imprisoned in its cocoon, begins to awaken from its long torpor, and signs of life are manifested by the rapid motion of its abdomen. In the latitude of Boston, the earliest date at which I have seen a perfect insect is the 20th of May. From this time until the middle of July, the moths continue to come out of the cocoons. The cocoon being perfectly closed, and a hard gummy, resinous substance uniting its silken fibres firmly together, it is quite hard for the insect to open it, as it has no teeth, nor instrument of any kind to cut through it, and the hooked feet are far too feeble to tear such a dense structure.

But the moth must have some means of exit from the cocoon. In fact they are provided with two glands opening into the mouth, which secrete during the last few days of the pupa state, a fluid which is a dissolvent for the gum so firmly uniting the fibres of the cocoon. This liquid is composed in great part of bombycic acid. When the insect has accomplished the work of transformation which is going on under the pupa skin, it manifests a great activity, and soon the chrysalis-covering bursts open longitudinally upon the thorax; the head and legs are soon disengaged, and the acid fluid flows from its mouth, wetting the inside of the cocoon. The process of exclusion from the cocoon lasts for as much as half an hour. The insect seems to be instinctively aware that some time is required to dissolve the gum, as it does not make any attempt to open the fibres, and seems to wait with patience this event. When the liquid has fully penetrated the cocoon, the pupa contracts its body, and pressing the hinder end, which is furnished with little hooks, against the inside of the cocoon, forcibly extends its body; at the same time the head pushes hard upon the fibres, and a little swelling is observed on the outside. The contractions and extensions of the body are repeated many times, and more fluid is added to soften the gum, until under these efforts the cocoon swells, and finally the fibres separate, and out comes the head of the moth. In an instant the legs are thrust out, and then the whole body appears; not a fibre has been broken, they have only been separated.

To observe these phenomena, I had cut open with a razor, a small portion of a cocoon in which was a living chrysalis nearly ready to transform. The opening made was covered with a piece of mica, of the same shape as the aperture, and fixed to the cocoon with mastic so as to make it solid and air-tight; through the transparent mica, I could see the movements of the chrysalis perfectly well.

When the insect is out of the cocoon, it immediately seeks for a suitable place to attach its claws, so that the wings may hang down, and by their own weight aid the action of the fluids in developing and unfolding the very short and small pad-like wings. Every part of the insect on leaving the cocoon is perfect, and with the form and size of maturity, except the pad-like wings and swollen and elongated abdomen, which still gives the insect a worm-like appearance. The abdomen contains the fluids which flow to the wings.

When the still immature moth has found a suitable place, it remains quiet for a few minutes, and then the wings are seen to grow very rapidly by the afflux of the fluids from the abdomen. In about twenty minutes the wings attain their full size, but they are still like a piece of wet cloth, without consistency and firmness, and as yet entirely unfit for flight; but after one or two hours they become sufficiently stiff, assuming the beautiful form character-

istic of the species. If, while the wings are growing, they are prevented from spreading by some agency, they will be deformed for ever. Sometimes when the wings are developing, the afflux of liquid is so great that some parts of the wing swell up considerably; and if one of these swellings be opened with a pin and the sac emptied, a singular phenomenon will result; the wing which has lost so much of its fluids will be smaller than the others, and sometimes it will retain the normal form of the wing, only being smaller, while the wound can be detected only on very close observation. I have in my cabinet a perfect specimen of such an insect: naturalists would regard it as a monstrosity.

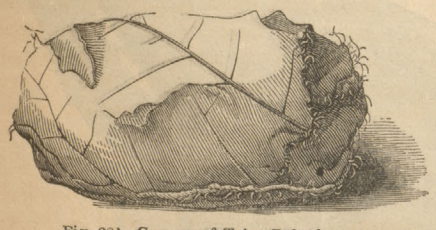


Fig. 221. Cocoon of *Telea Polyphemus*.

The moth remains quiet all day, and sometimes all night and the following day, if the night be cold; but if it be warm and pleasant, at dusk or about eight o'clock, a trembling of the wings is observed for a few minutes, and then it takes its flight, making three or four circles in the air. The male flies only a few minutes, and then rests for two or three hours in the same place, not making any motion.



Fig. 222. Pupa of *Telea Polyphemus*.

It is worthy of notice that the place of rest is always the extremity of an oak-leaf. Why he remains there so long I could not ascertain. The female continues to fly about the bushes, and though a virgin, she lays eggs, which are, however, of no use for the propagation of the species; she continues so doing for two or three hours, and then rests all night attached to some plant, probably waiting for her mate, who during this time has either remained motionless, or has been feeding on the sweet exudation of the oak leaf. Soon after the female moth has laid these useless eggs, the males become very active, and fly in search of their partners, whom they soon discover, especially if there be a slight breeze and the air loaded with vapours.

The moth lays her eggs on the under side of the leaves, sometimes on a twig; generally but a single egg is deposited at one place, rarely are two or three found together. I have observed that eggs are sometimes laid upon plants which the young larvæ refuse to eat, and in several instances where there was no other plant within a long distance; and consequently the young worms died: thus it seems that instinct, like reason, sometimes commits blunders, and is not so infallible a guide as has been supposed.

The incubation of the eggs lasts ten or twelve days, according to the temperature. The young worm eats its way through the shell of the egg; sometimes the young larva comes out of the egg tail foremost, as the hole in the shell is large enough to allow of the exit of the tail, but is not large enough for the head to pass through; so the worm is condemned to die in the egg. As soon as it is fairly hatched out, the larva continues for some time eating the egg-shell, and then crawls upon a leaf, going to the end of it, where it rests for two or three hours, after which it begins to eat. The hatching out takes place early in the morning, from five till ten o'clock; rarely after this time.

The Polyphemus worm, like all other silkworms, changes its skin five times during its larval life. The moulting takes place at regular periods, which come round about every ten days for the first four moultings, while about twenty days elapse between the fourth and fifth moulting. The worm ceases to eat for a day before moulting, and spins some silk on the vein of the under surface of a leaf; it then secures the hooks of its hind legs in the texture it has thus spun, and there remains motionless; soon after, through the transparency of the skin of the neck, can be seen a second head larger than the first, belonging to the larva within. The moulting generally takes place after four o'clock in the afternoon; a little before this time the worm holds its body erect, grasping the leaf with the two pairs of hind legs only; the skin is wrinkled and detached from the body by a fluid which circulates between it and the worm; two longitudinal white bands are seen on each side, produced by a portion of the lining of the spiracles, which at this moment have been partly detached; meanwhile the contractions of the worm are very energetic, and by it the skin is pulled off and pushed towards the posterior part; the skin thus becomes so extended that it soon tears, first under the neck, and then from the head. When this is accomplished the most difficult operation is over, and now the process of moulting goes on very rapidly. By repeated contractions the skin is folded towards the tail, like a glove when taken off, and the lining of the spiracles comes out in long white filaments. When about one half of the body appears, the shell still remains, like a cap, inclosing the jaws; then the worm, as if reminded of this loose skull-cap, removes it by rubbing it on a leaf. This done, the worm finally crawls out of its skin, which is attached to the fastening

made for the purpose. Once out of its old skin, the worm makes a careful review of the operation, with its head feeling the aperture of every spiracle, as well as the tail, probably for the purpose of removing any broken fragment of skin which might have remained in these delicate organs. Not only is the outer skin cast off, but also the lining of the air-tubes and intestines, together with all the chewing organs and other appendages of the head. After the moulting, the size of the larva is considerably increased; the head is large compared with the body; but eight or ten days later it will look small, as the body will have increased very much in size. This is a certain indication that the worm is about to moult. Every ten days the same operation is repeated; from the fourth moulting to the time of beginning the cocoon, the period is about sixteen days.

The worms seem entirely unable to discern objects with their simple eyes, but they can distinguish light from darkness, as a very simple experiment will show. If a worm be put in a box with two holes in it, one of them turned to the light, the other to the dark, the caterpillar will very soon come out through the hole turned to the light.—*The American Naturalist.*

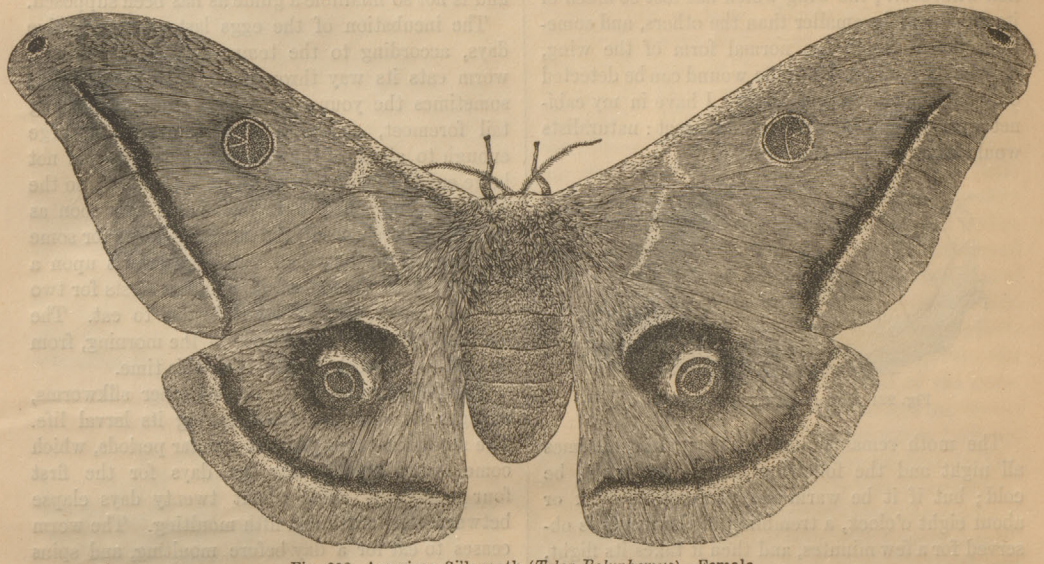


Fig. 223. American Silk-moth (*Telea Polyphemus*)—Female.

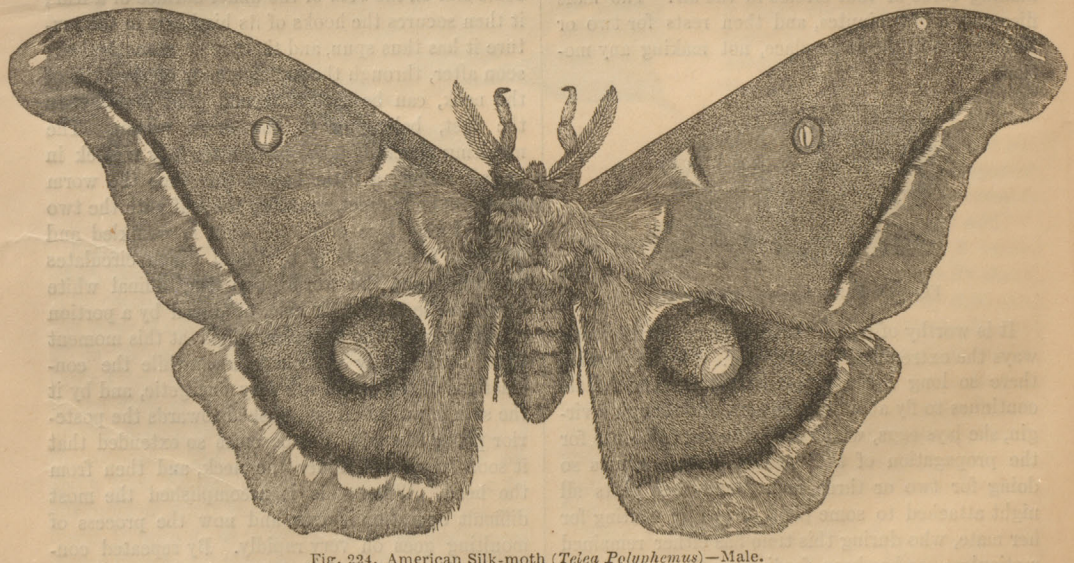


Fig. 224. American Silk-moth (*Telea Polyphemus*)—Male.

THE JAY.

(*Garrulus glandarius.*)

WHEN strolling through the woods in November, with the remembrance of what they were in May, we cannot fail to be struck at the change which has taken place. The warm tints of autumn have disappeared; the leaves are gone; the forest trunks are moist and moss-grown; slimy fungi overspread their roots, and various species of *Helix* and *Clausilia* are found upon the bark. On every twig a drop of moisture glistens, and as it falls upon the brown leaves below, all Nature seems to weep that summer is gone. And this change is not only apparent in the trees, but in the very birds which cross our path. We now see quite a different class to that which thronged the woods in spring. The Willow-wren, Wood-wren, Chiff-chaff, Black-cap, Nightingale, and noisy Whitethroat, which flitted so conspicuously before us then, have all since disappeared; and while Tits of various species seem more numerous than ever, we notice new arrivals, and listen to the whistle and chatter of the Redwing and Fieldfare, which have come to pass the winter with us.

But since the leaves have fallen, a curtain has dropped which long concealed from view our shier woodbirds. The Pigeon, of whose presence we were usually aware from hearing his loud "coo," or flapping wing, is now seen perched upon the leafless bough. We can now watch every movement of the nimble Nuthatch, and observe the stealthy actions of the Creeper, and as we pick the last over-ripe blackberry, or taste the fallen beech-mast, in our search for shells or fungi, we fancy that November is not such a dull month after all as some would represent it. On the contrary, a prying naturalist can find much to interest him at this season of the year.

A noisy chattering disturbs our reflections, and we look up just in time to catch sight of one of the shiest of our wood-birds, the Jay. So long as the green leaves screened our approach, we knew him only "as the blind man knows the Cuckoo—by the bad voice"; * but now that this screen is gone, we can see the author of the noise in all the glory of his bright plumage.



Fig. 225. The Jay (*Garrulus glandarius*).

Who has not stopped at the end of a green "ride" to admire the dead Jay, strung up, like a thief, amidst Hawks, Cats, and Stoats? His rosy brown back, white tail-coverts, and black and white wings, with their bright blue coverts, render him one of the handsomest of our woodland birds.

Under the name of *Corvus glandarius*, the Jay has been ranked amongst the Crows; but although to a certain extent there is a family resemblance, those who have had the opportunity of observing the present species in a wild state will agree that in haunts,

* *Merchant of Venice*, Act v., Scene 1.

habits, and the nature of his food, he differs remarkably from all his sable friends, and that the generic name *Garrulus*, which Brisson, in 1760, proposed for the Jays, was not only deservedly but very appropriately applied.

Our British Jay has been called *glandarius* from his partiality for acorns, beech-mast, and other forest fruits; but he is in fact omnivorous; for in addition to the food already named, he takes grubs, worms, mice, eggs, and young birds, and becomes remarkably bold in the autumn in robbing orchards of cherries and damsons. He has a curious habit of hoarding up food for future occasion, and has frequently been detected on a visit to a large store of acorns. The Jay evinces a great partiality for oak-woods: we have always noticed the species more frequently where oaks abound—no doubt on account of the sustenance and shelter which these trees afford.

The nest is generally placed in the fork of a tree, and usually at no great height from the ground. As schoolboys we always considered a Jay's nest a great prize; and when fortunate enough to find one with five or six eggs, we only parted with one of them for a good "exchange." Caliban evidently considered a Jay's nest an irresistible temptation when trying to induce Trinculo to explore his island.

> "I'll show thee every fertile inch o' the island,
> * * * * * *
> I'll show thee the best springs; I'll pluck thee berries;
> I'll fish for thee, and get thee wood enough;
> * * * * * *
> *Show thee a Jay's nest*, and instruct thee how
> To snare the nimble marmozet."
>
> *The Tempest*, Act ii., Scene 2.

The egg is a very plain one for the bird which lays it; the ground-colour white, so closely freckled over with grey or yellowish-brown as to give it the appearance at a little distance of being uniformly grey or brown. Not unfrequently there are three or four hair-lines of a blackish colour at the larger end.

When the young are able to fly, instead of leaving the place of their birth and shifting for themselves, as the young of many birds do, they remain a long time with their parents, going about the woods in little family parties with much chattering and screaming.

The Jay is wonderfully inquisitive, and, although shy enough if he catches sight of you, he may nevertheless be decoyed within thirty or forty yards, if you remain concealed. We have seen a French gamekeeper bring a Jay within shot by imitating the squeal of a young rabbit; but we could never get very near to one of these birds by trying to "stalk" him. The sense of hearing in the Jay is so acute that, even when he cannot see you, the cracking of a twig under foot is often sufficient to alarm him, and away he goes with a chatter, as it seems, of derision. Keepers generally find the trap more effective than the gun if they want to destroy a Jay.

If taken young and well trained, this bird makes a most amusing pet, not only from his curious actions, but from his great powers of mimicry. He will learn to whistle, and imitate a cat, dog, or hen to great perfection. In some parts of Sussex we have often noticed tame Jays at the cottage-doors, and we have wondered why a bird of such attractive plumage and such engaging manners is not more generally sought after.

If, instead of being killed by shot or trap, Jays were taken alive, the object of the game-preserver would be accomplished, the keeper would be rewarded, the bird-fancier delighted, and the life of a beautiful bird would be spared.

J. E. Harting.

PTERODACTYLES.

Among the many formidable monsters of the old world, with which palæontology has made us familiar, I think the palm for singularity of conformation and hideousness of aspect must be ceded to the Winged Lizard, known to us as the Pterodactyle. Many strange forms has the old world seen, and many there have been whose remains testify that they were of larger bulk and huger proportions than this Saurian: the Megatherium, the Dinotherium, the Mastodon, were great unwieldy beasts, and doubtless they would have been "awkward customers" if met with in a narrow lane, had narrow lanes and their makers been in existence; perhaps the latter were. *Quien sabe?* But after all, independently of their being vegetable-feeders, these enormous creatures were but gigantic specimens of what we are used to see nowadays. The Mammoth was but an overgrown elephant, the Megalonyx an enlarged sloth, the Cheirotherium a frog puffed up to ox size, anticipating the fable. But, for some occult reason, the moment Saurians come on the *tapis* we recognize nothing "lizardy" about them, such as lizards are in these days. Those that "were made to take their pastime" in the waters were weird and unearthly to the last degree, with their supernaturally long necks and great goggle eyes. And as for those on the land, whose *débris* are ever and anon turned up, they were more like the mythical dragon than respectable *Lacertæ*. Imagine a crocodile's head with its formidable rows of strong pointed teeth (fig. 226) elevated on a long neck, and attached to a body which combined great strength with the faculty of walking or flying at the will of the owner. Verily, Pterodactyle must have been a scourge and a terror to its lesser compatriots!

The twenty-two species of which we are cognisant varied greatly in size: while some skeletons which have come down to us are scarcely larger than those of a sparrow, there are others which must have

rivalled the Condor or the Lämmergeier in magnitude and powers of flight. In many respects this flying lizard resembled the little bat of our own era, especially in the form and structure of its wings, which were not as those of a bird, but consisted of

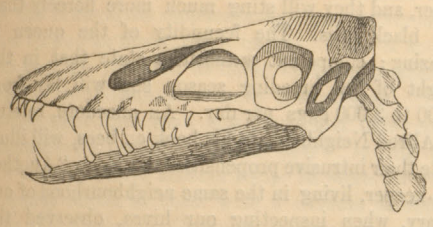


Fig. 226. Head of Pterodactyle.

a membrane stretched between the bones of the arm and the hand, and therefore in a position to be folded up when the animal was walking or at rest; and it probably both walked and rested in an upright position. But there is one main point of difference to be observed in the structure of the wing, in these two widely separated animals, which could not have been without a special purpose. In the bat the thumb is the shortest member of the

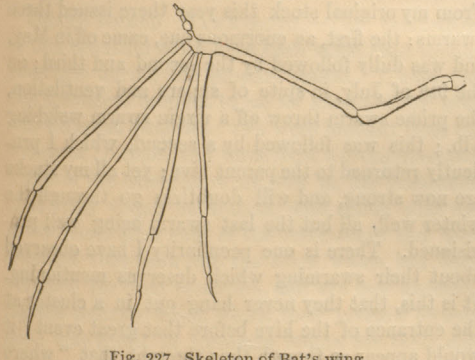


Fig. 227. Skeleton of Bat's wing.

hand (fig. 227), the fingers being enormously lengthened in order to admit of the membrane being stretched between them (fig. 228). In consequence, the thumb alone is free for prehensile purposes; it terminates in a stiff hook, and by it the animal



Fig. 228. Wing of Bat.

suspends itself when at rest. Now, the construction of Pterodactyle's hand was totally different; there the thumb and the three next fingers were of normal size, while the little finger alone was lengthened so as to reach nearly the whole length of the body (fig. 229). The result of this arrangement was that the wing membrane was spread out only between the arm-bones and this finger, the remaining members of the hand being left free for prehensile purposes. It is probable, then, that the wing of the Pterodactyle, not being stretched on ribs, was more "baggy" than that of the bat, and that consequently its movements were not of so active a nature; and this would help to confirm the words of Professor Phillips, that it "was accustomed to flap the air rather heavily, not far above shallow waters." ("Life on Earth," p. 41.) The bat, as is well known, takes its food with its mouth as it flits through the night-air; in fact, it has no hand at liberty wherewith to seize its prey. Pterodactyle too is believed to have been insectivorous; but he is also more than suspected of a penchant for a fish diet, and that the power of swimming was developed in his singular body. It is almost absurd to suppose that those huge crocodilian jaws were confined to snapping up beetles and dragon flies; but the form and structure of the teeth preclude the idea of its having been a flesh-feeder. So I suppose it partook, in some respects, of the habits of its aquatic brethren, and fed largely on fish, in the seizure of which its strong talons must have been of considerable use. But whether it pursued them beneath the water, or, like the Sea-Eagle, struck them as they rose to the surface, must for ever remain a mystery.

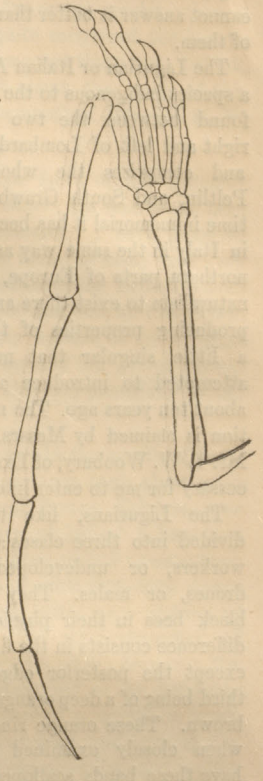


Fig. 229. Skeleton of Wing of Pterodactyle.

The remains of this monster are distributed through the Lias of Lyme Regis, the Stonesfield Oolite, and more especially the lithographic limestone of Solenhofen in Bavaria, which also abounds in the remains of fish and crustacea.

N.B.—Pterodactyle would repudiate with scorn any but the most distant relationship with the so-called "Flying Lizard" (*Draco volans*) of these degenerate days, whose only organ of flight is a membrane stretching out from the ribs, and enabling the animal, like the flying-squirrel and the flying fish, to make long leaps.

Havre. W. W. Spicer.

LIGURIAN BEES.

A CORRESPONDENT of Science-Gossip having put forward a query whether the Ligurian Bees are a distinct species, I think I cannot answer it better than by giving some account of them.

The Ligurian or Italian Alp Bee (*A. Ligustica*) is a species indigenous to the South of Europe, being found between the two mountain-chains to the right and left of Lombardy and the Rhetian Alps, and comprises the whole territory of Tessin, Peltlin, and South Grawbunden. Although from time immemorial it has been cultivated with success in Italy in the same way as the common bee in the northern parts of Europe, and was well known by naturalists to exist there and to have all the honey-producing properties of the black bee, it is not a little singular that no one appears to have attempted to introduce and acclimatize it, until about ten years ago. The merit of its first introduction is claimed by Messrs. Neighbour & Sons, and Mr. T. W. Woobury, of Exeter, but it will be unnecessary for me to enter into their respective claims.

The Ligurians, like the common bees, are divided into three clases:—first, queens; second, workers, or undeveloped females; and third, drones, or males. They vary slightly from the black bees in their physical characteristics. The difference consists in the first rings of the abdomen, except the posterior edge, and the base of the third being of a deep orange-colour, instead of a dark brown. These orange rings are almost transparent when closely examined in the sun; the drones have these bands scalloped, and attain a great size, being half as large again as the black drones. Both the queens and workers are somewhat larger; the latter, too, differ in their longer and more slender form. Whether they differ anatomically, I am unable to state from personal observation; one writer, however, says:—"Naturalists consider the Italian a very superior race, and that the various organs are stronger and of greater capacity; it is, however, not easy to define the precise superiority." Their cell-construction, too, differs, the Ligurians building them broader and deeper, fifteen of their cells being equal to sixteen of the common kind.

Baron von Berlespsch, an eminent German apiarian, thus sums up their advantages. He says that he has found—"1. That the Italian bees are less sensitive to cold than the common kind. 2. That their queens are more prolific. 3. That the colonies swarm earlier and more frequently. 4. That they are less apt to sting. 5. They are more industrious. 6. That they are more disposed to rob than the common bees, and are more courageous and active in self-defence. They strive, whenever opportunity offers, to force their way into colonies of common bees; but when strange bees attack their hives, they fight with great fierceness and with incredible adroitness." Most of the Baron's opinions I can endorse, but I cannot agree with him that they are less apt to sting; perhaps they may be, until interfered with, in any way; but once excite their anger, and they will sting much more fiercely than the black bees. The fecundity of the queen is amazing; competent authorities state that in the height of the breeding season she will lay from 1,000 to 3,000 eggs per day. An anecdote, related by Alfred Neighbour, in his book on bees, will illustrate their intrusive propensities. He says: "Another bee-keeper, living in the same neighbourhood of our apiary, when inspecting our hives, observed the yellow bees: he exclaimed, 'Now, I have found out where those strange-looking bees come from; for,' said he, 'these yellow-jackets are incessant visitors to my hives. I thought they were a species of wasp that had come to rob, and until now I have been unable to account for their appearance at my hives, so that I have killed them by hundreds.'" My own Ligurians have increased in such a manner as to astonish bee-keepers here; certainly, they are not generally very scientific, the old straw hive and brimstone-pit being the rule, not the exception. From my original stock this year there issued three swarms: the first, an enormous one, came off in May, and was dully followed by the second and third; on the 9th of July, in spite of supers and ventilation, the prime swarm threw off a virgin swarm weighing 5 lb.; this was followed by a second, which I prudently returned to the parent hive; yet all my stocks are now strong, and will doubtless go through the winter well, all but the last swarm being well provisioned. There is one peculiarity I have observed about their swarming which deserves mentioning. It is this, that they never hang out in a cluster at the entrance of the hive before that great event; it would appear as though they thought that "where there is a will there is a way," and accordingly cram themselves into the hive, even at the risk of being suffocated.

I can hardly agree with J. W. Stroud, when he says there are no hybrid drones. Thus, suppose an Italian princess unites with a black drone, she will breed a mixed queen and worker progeny, but pure drones; but suppose this mating with black drones continues through several generations, we should, according to J. W. Stroud, get a queen breeding almost pure black bees, but pure Ligurian drones. This seems to be a subject which will bear further investigation. I think there can be no doubt that the Ligurians are a distinct species; but that they are very nearly allied is also evident. At some future time I hope to be able to give some account of another honey-bee which has been lately introduced into England; namely, the Egyptian Bee (*A. fasciata*); want of room prevents my doing so now.

D. D. B., *Cantab.*

ZOOLOGY.

Recipe for Human Parasites.—If you have found ordinary methods unavailing for ridding yourself of these unbidden guests, I can furnish you with a *probatum est* recipe, which Dr. Clarke tells us the Hungarian shepherds find completely effectual to put to flight these insects. This is not, as you may be tempted to think, by a remarkable attention to cleanliness—quite the reverse. They grease their linen with hog's lard, and thus render themselves disgusting even to fleas! If this does not satisfy, I have another recipe in store for you; you may shoot at them with a cannon, as report says did Christina, Queen of Sweden, whose piece of artillery, of Liliputian calibre, which was employed in this warfare, is still exhibited in the arsenal of Stockholm. But, seriously, if you wish for an effectual remedy, that prescribed by old Tusser, in the following lines, will answer your purpose:—

> "While wormwood hath seed, get a handfull or twain,
> To save against March, to make flea to refraine;
> Where chamber is sweeped, and wormwood is strown,
> No flea for his life dare abide to be known."

—*Kirby's Introd.*

Death's-head Hawk-moth.—The caterpillars of this beautiful moth have been more than usually abundant during the present season. I have had five specimens brought to me for identification, from four different localities: two were brought from the county of Durham, and three from Northumberland. Three of the caterpillars are now in the possession of as many young naturalists, who reside with me. A few hours after each of the caterpillars had been obtained, they sank into the earth which had been prepared for their reception, and are now undergoing the transformation which their juvenile owners hope may result in specimen moths for their collections.—*T. P. Barkas.*

Kestrel (*Falco tinnunculus*) Breeding in Captivity.—In 1855, a pinioned Kestrel, which was kept in a walled-in garden at Burnley Hall, East Somerton, in this county, made a nest of sticks, matting, moss, &c., in the corner of a tool-house, and hatched five young ones. She had no doubt been visited by a male from the adjacent ruined parish church, in which kestrels frequently breed. The late Mr. Yarrell suggested setting a watch the next year, to ascertain full particulars, but she was unfortunately killed by accident the following winter, or no doubt the singular occurrence of 1855 would have been repeated.—*J. G. N., Aldborough, Norwich.*

Short-eared Owl (*Strix brachyotus*) Breeding in Norfolk.—I saw a nest with three or four young ones, nearly ready to fly, in the Winterton Decoy, in 1859; there could be no error as to the species, as the feathers from which it gets its name were well developed. This year (1869) a fine specimen of the same bird was shot by a gamekeeper in this parish, in July; it had one of its wings damaged, which appeared to be the only injury it had received. It was kept in captivity five or six weeks, when it was turned out, having quite recovered the injury; its companion was not seen; but there can, I think, be no reasonable doubt about the cause of this bird's presence here in the month of July.—*J. G. N., Aldborough, Norwich.*

Emperor Moth.—The larva of the Emperor Moth (*Saturnia pavonia minor*) has been found here in great abundance this summer. I have procured 12 or 15; a friend has also found as many, and I am told that one day the children of the British School here destroyed between 300 and 400, all full-grown. I do not remember having noticed it in so great abundance before. The larva of the Privet Hawk-moth (*Sphinx pinastri*) is also very plentiful.—*A. A., Felstead.*

Incident of a Thrush.—In the month of April last, the following circumstance took place upon the estate of Mr. Samuel Porter, Eskdale, near Whitehaven;—A number of ladies' collars and tuckers, a cap, &c., had been placed upon a bush to bleach. In the course of a few days they disappeared, and as some young cattle were grazing in the neighbouring fields, they were suspected of having eaten them. Shortly after, however, the missing articles were discovered in an adjoining meadow, among the branches of a hawthorn, interwoven with moss, grass, and wool, and forming the nest of a thrush; having been carried a considerable distance, and appropriated as building materials by these little songsters. Much to the disgrace of some ruffianly hand, the nest was destroyed, that the missing articles might be taken away as relics of a remarkable circumstance.—*John Johnson, New Jerusalem Day Schools, Salford.*

Red Admiral.—Whilst going through a wood at Bournemouth, the end of last month, I came across a larva of the Goat-moth (*Cossus Ligniperda*) walking across the path. I looked about to find the tree from which it came, and about a couple of yards from me I saw a birch-tree, round which were flying about a dozen or more of the Red Admiral butterfly (*Vanessa Atalanta*). There I found the burrows of the Goat-moth. Some one had evidently been cutting the bark away to find the larva, and the juice, I suppose, from the tree had attracted the butterflies. I picked off several of them from the tree with my fingers, and for several days after the tree was still visited by them in numbers. I should like to know if any of your readers have ever noticed this attraction for the Lepidoptera before.—*S. J. B. Moseley, Birmingham.*

Cuttle-fish.—In the article in your October number, entitled "A Chapter on Cuttle-fishes," our common Cuttle-fish of this coast is mentioned two or three times. The article is from *The American Naturalist*, and it does not appear clear whether an American or an English Cuttle-fish is described; but if the latter, the description does not at all apply to the *Sepia officinalis* (figured on p. 219), which is invariably spoken of as "the common Cuttle-fish." Any member of the genus *Loligo* or of *Ommastrephes* may be intended, but probably one of the latter (*O. todarus*) is meant. I have taken this handsome animal twice this year—once in April, near Hartlepool, and again (several specimens) in July, near Lerwick, Shetland. The following dimensions of the Hartlepool specimen, which was a very fine one, may be interesting to some of your readers:—Extreme length from tip of tail to end of tentacle 2 ft. 1 in., length of trunk 1 ft., girth of ditto 7 in., length of tail 5½ in., width of ditto 6½ in., length of head 2½ in., ditto of each tentacle 11½ in., ditto of shortest arm 5¾ in.. At least three species of each of the genera *Loligo* and *Ommastrephes* have been taken in the British seas, and all of them are called "squids."—*Robert Morton Middleton, Jun.*

Otters and Badgers in South Wiltshire.—No less than four Otters have been killed, to my knowledge, in the valley of the Nadder, within fifteen or sixteen months, one of them, a fine dog, having on one of his feet when captured a trap which had been set for members of his fraternity the evening before, in a meadow between three and four miles distant. My brother has now in his possession skins of five badgers, all killed, I believe, by himself in the same neighbourhood within the same time. A friend, also, on whom I can rely, has told me that five young ones were reared in a copse about a thousand yards from his house last spring. —*A. G. Tisbury.*

Fossils at Walthamstow.—In July, 1866, as I was searching for freshwater shells in the copper-mill stream in the valley of the river Lea, at Walthamstow, I observed a heap of fossil bones which had been cast on the bank from a dredging-barge: they belonged to three species of mammalia—the two first-named are extinct—the long-fronted ox (*Bos longifrons*), the gigantic Irish deer (*Megaceros Hibernicus*), and the wild horse (*Equus Caballus*). I have since found the remains of the *Megaceros Hibernicus* in nearly every excavation I have visited in this valley, extending from Lower Clapton to Waltham Abbey. The remains are found from fourteen inches to twelve feet beneath the surface; but the largest quantity is yielded by a bed of grey silt generally found at a depth of about four feet. A few days ago I discovered, near Higham Hill, Walthamstow, two lower jaws of this species, several fragments of pottery, and two cut bones, all in juxtaposition, and lying at a depth of only seventeen inches. Has the *Megaceros Hibernicus* lived down to a more recent period than that allowed by most geological writers; or has the deposition of sediment been very slow in this valley? A writer on this subject says: "Its extinction in Ireland has occurred so many ages past, as there remains among us not the least record in writing, or any manner of tradition, that makes so much as a mention of its name." If the same observations hold good with regard to England, I cannot possibly account for the association of the remains of the *Megaceros Hibernicus* with works of art at so slight a depth in an English river-valley, a fact which I have not read of in any geological work.—*R. E. Olliver, Sherboro' House, Stamford Hill.*

Flycatcher's Nest.—This year a Flycatcher built her nest in the hinge of an unused door of my coach-house, and in time my little boy found four eggs in it, of which he took one for his collection. We watched for the hatching of the rest, but after a long delay, finding that the bird had given over sitting, we examined the nest, and found that a *second* nest had been made inside the first, and on the top of the old eggs. In the new nest four eggs were laid, and eventually hatched.—*A. A.*

Leucania vitellina (Brighton Delicate).—A specimen of this rare moth was captured at Sugur on the 20th of September, near Brighton, by a working naturalist named Gates, and sold under the impression of its being only a variety of *L. pallens*, to a Mr. Vaughan, of London, for seven shillings and sixpence. According to Newman, but two have been taken in England before. He took the same evening two dozen *Agrotis saucia*.—*T. W. Wonfor, Brighton.*

Morning Visitors.—Every morning, before I am out of bed, there may be seen feeding on one of the window-sills of my bedroom, a pair of nuthatches, a pair of great-tits, a pair of cole-tits, a pair of blue-tits, a pair of marsh-tits, and a pair of chaffinches, and sometimes a robin, a blackbird, and a sparrow or two. They have a small pan of water, and their food comprises hemp-seed, nuts, cheese, bread-and-milk, and meat; all which are placed at their disposal by my wife overnight, or by six o'clock in the morning. You know how near we are to the high road; passers-by must be astonished at the sight outside our window.—*W., Sundridge.*

Oriental Locust.—A fine specimen of the Oriental locust (*Locusta migratoria*), similar to those caught at St. Austell and Truro on Saturday last, has just been captured on Marazion green, by Mr. John Kinsman, Penzance, who has preserved it alive.—*Western Morning News*, Oct. 12.

BOTANY.

LASTREA MONTANA.—Several of the standard works on British ferns, in describing the vernation of *Lastrea montana*, state that the pinnæ "*are not convolute.*" I have examined several plants of *montana* during the expansion of their fronds, and have always found that the pinnæ are convolute. I should like to know if any of your correspondents have noticed the same character.—*J. Morley, Jun.*

VERONICA BUXBAUMII.—It may interest your correspondent "R. W." if I mention that *Veronica Buxbaumii* was three years ago (when I was living there) very abundant in my garden at Evenlode, near Moreton-in-Marsh, Gloucestershire. It was fond of rubbish-heaps, but was also so abundant all over my kitchen garden as to be a nuisance.—*W. Hambrough.*

CONVALLARIA VERTICILLATA.—In books on botany it is commonly stated that the principal native habitat of this plant is the Den of Rechip, five miles from the beautiful village of Dunkeld and the famous hill of Birnam, in Perthshire. It is possible it may still be found there, but I am sure it is very rare, if it be not quite extinct. The den or ravine is about a mile and a half in length, thickly wooded on its steep sides, and a sparkling stream running through its midst. A friend and I searched the glen thoroughly in July last, but there was no appearance of Convallaria. The luxuriance of ferns, however, is something remarkable. Dryopteris, Phegopteris, Filix-fœmina, Dilatata, and others attain a prodigious size, and there was one plant covering a considerable space, which we did not expect to find there. This was *Saxifraga umbrosa*, London Pride, quite naturalized. No doubt it had been planted or its seeds scattered there at some time, but we could not see that it was cultivated in any of the cottage gardens at the foot of the glen. Authors seem to copy the statements of preceding writers without any effort to verify them. Hence habitats are given for plants in which they no longer exist. This is the case at least with *Epimedium alpinum*, said to grow on Carrock and Skiddaw, in Cumberland. There is no such plant there now.—*R. W.*

THE HOLLY.—May I be permitted to ask Mrs. Watney in what part of Wales the Holly is called "Hellig," as there *must* be error somewhere. It would be a pity to demolish so much ingenuity as Mrs. Watney has displayed in tracing the etymology of the Holly; but I am afraid it must be done, for the simple reason that the name "Helyg" (which, no doubt, is the same as Hellig) is not the name of the Holly at all, but of the *Willow*,—at least, it has this name in eight Welsh counties, and in every Welsh writer on plants that I am acquainted with (take "Davies's Welsh Botanology" for a standard). I know not whether Mrs. Watney is a proficient in her native language or not; if so, the error may be only one of substitution. The Welsh name for holly is Celyn, as every Welshman knows: thus we have Bryn-Celyn, holly-bank, &c. However, as Mrs. Watney's propositions are only advanced as a *fancy*, without positiveness, it is not so great a matter, though I am afraid her "conclusions" about Holly and Hellig will be found more *fanciful* than real.—*Thomas Williams, Bath Lodge, Ormskirk.*

HOLLY (p. 235).—When I read Mrs. Watney's note, in which she derives our English name "Holly" from the Welsh "Hellig," it struck me that, although the derivation *seemed* so probable, there must be some mistake, as *I* had always heard the Holly called *Celyn* (pronounced *Kellin*) in Wales. I thought it possible, however, that the word "Hellig" might also mean "Holly" (as indeed it may, for anything I know to the contrary, in *South* Wales); so I referred to a dictionary, and a Welsh Herbal, compiled by the Rev. John Williams in 1737. There I find "Hellig" is given as the Welsh for "a willow tree." I think, in all probability, the word "Holly" *is* derived from the Celtic; not, however, from "Hellig," but from *Celyn*, which, by an easy change, becomes *Hollin*,—a word still in use in many country places, and which is also the name of the plant in the Manx language, another branch of the Celtic; and this has been shortened into "Holly."—*Robert Holland.*

FLORA OF MIDDLESEX.—This excellent Flora by Messrs. Trimen and Dyer, is just published. It forms an imposing volume of 428 crown octavo pages, and will, we imagine, fully gratify the most sanguine expectations of the subscribers. It is our intention to give a more extended notice of this work at an early date, and only mention it now in order that all London and Middlesex botanists may secure copies.

FAGUS SYLVATICA.—Many of our beech-trees here are infested by a minute insect, of a scarlet colour, which envelops itself in a kind of white downy matter, so that the bark is quite white in places. I have heard it called, though perhaps only vulgarly, the "American bug." Several fine trees have died in consequence of these insects preying upon the bark. As I have not to my knowledge seen these in any other place, might I ask some one conversant with the subject, to name and give some account of these pests. If not beyond the scope of your journal, I should be glad to know some successful means of saving the trees by exterminating the destroyers.—*H. N., Oscott.*

MICROSCOPY.

Spirulina.—I beg to record a new locality for *Spirulina tenuissima*, for which only two stations, both in Wales, are given by Harvey. I found it on Sept. 8th among filiform Algæ, near the pier at Worthing. As I only saw an isolated filament, I am not quite certain of the species. If it is not *S. tenuissima*, it is *S. Hutchinsiæ*, which was unknown to Harvey, and chiefly differs from the other by its larger size.—*D. H. Scott.*

Scale of the Eel.—May I be permitted to add to the notice of the above at p. 187, that these lovely scales are so often overlooked, because they are situated *under* the outer skin, instead of *upon* it, as in other fishes? I have been told, but cannot now recollect my authority, that it is only of late years that the Jews have permitted themselves to include the Eel among things to be eaten. Until science, aided by the microscope, showed the falsity of the notion, eels were scouted as being "without scales," and consequently forbidden by the law (Levit. xi. 9—12). The scales may be easily obtained by "picking" at a piece of the skin in a dried or half-dried condition with a rather stout needle, when they will be jerked out. The skin itself, with the contained scales mounted in balsam, forms a most lovely object for the polariscope.—*W. W. Spicer, Havre.*



Fig. 230. Scale of Salmon (*Salmo salar*).

Salmon Scales.—In continuation of our figures of the scales of freshwater fishes we give that of the Salmon (*Salmo salar*) from specimens kindly furnished for the purpose by Henry Lee, Esq., F.L.S. Without this scale no collection would be complete, as it furnishes a peculiar type not supplied by any of those already given.

Cells for Microscopic Objects.—Before your readers mount many objects in the India-rubber cells, described in your October number, I would give them a word of caution as to my own experience, and that of friends here, who tried the same form of cell in 1861-62. We found there was no true adhesion between the glass and India-rubber, and that a very slight jar caused the dismounting of the whole; next, Brunswick-black, one of the most untrustworthy of cements, from its tendency to flake, soon cracked and peeled off, thus letting in fungoid growth; then the cells very soon *perished*, as the term is when the India-rubber becomes brittle. We found the same objections hold against gutta-percha, which has been recommended as a cheap form of cell, with this addition, that it was a wonderful *nidus* for fungus. Perhaps few have tried more experiments in the way of cells than I have; besides those above mentioned I have, *inter alia*, tried card-board, leather, ivory, bone, wood, lead, tin, glass, brass, &c., as well as cells moulded or cut from pipe-clay; ditto with various cements, pottery, electric cement, marine glue, sealing-wax, marine glue and sealing-wax combined, &c. Of all I prefer, among the former, glass or brass, and of the latter, or home-manufactured, the glue and sealing-wax combined. The brass cells, which are very cheap and easy to fix, I make from brass rings; I used to employ different sized curtain-rings, until I became acquainted with those of which I enclose specimens. They are used by tailors as button moulds, and can be purchased in three sizes, at a woollen-draper's or tailor's trimming warehouse, at from 10d. to 1s. 4d. per gross; and therefore, as regards cheapness, can compete with the endless bands. Now, as to the mode of fixing; this is done by marine glue, or one of the many cements used for fixing glass and brass, or repairing glass or china. I prefer the marine glue, because, when properly manipulated, it never fails, and the slide will sooner break than the cell come off. My *modus operandi* is as follows: first, centre a batch of slides, and cut some marine glue into pieces the size of a pin's head; then, with wooden forceps, seize one end of the slide, drop a ring on centrally, place three or four pieces of glue at intervals outside, and touching the brass ring; hold the slide over a spirit-lamp, until the glue by capillary attraction runs under (care must be taken not to bake too much); then drop the slide on wood to cool, when the superfluous glue may be removed with a knife. To fix the glass cover, paint the ring with gold-size, and when tacky, drop on the cover; when dry, give it a coat of gold-size, and finish it off with asphalte or coachmaker's varnish. If required for fluid, I either paint the inside with gold-size or with electroplate before fixing. If a deeper cell is required, I cement two rings together. If required, I will describe the sealing-wax, &c., cells, on my plan of electro-plating.—*T. W. Wonfor, Brighton.*

NOTES AND QUERIES.

Caterpillars on the Willow.—The willows on the banks of the Stour, in this neighbourhood, are infested this autumn with caterpillars in such numbers that some of the trees are quite leafless, nothing being left but the midrib. As I have not been able to find out of what insect they are the larvæ, I will endeavour to describe them. Colour on centre of the body greyish-blue, or nearly approaching to that of the under surface of the leaf they feed upon. The extremities are orange, and along the whole body there are rows of black spots, except on the ventral side. Head black, legs six, and prolegs ten or twelve. In size they vary according to age, but when full grown they are as large as the caterpillar of the cabbage butterfly. They have never been observed here before this season. Are they the larvæ of a species of sandfly? —*W. Wright, M.D., Shepton-on-Stour.*

Carpels of Geraniums.—Having been solicited by Mr. Britten to give the name of the *Geranium* whose carpels, or styles, or *tails* (or whatever they are), that act or behave in a remarkable manner, as described by me in the September number of Science-Gossip, I beg to state that I have not particularized any *Geranium*, critically speaking, but had in view, when I made my remarks, the natural family of *Geraniaceæ*, *two* divisions of which, Erodium and Pelargonium, have the awns or styles convoluted or twisted in the manner I have described; but the section I had particularly in view was *Erodium*, and the particular species was *E. Manescavii*, a beautiful plant, which from its extra large carpels is well adapted to display what I have attempted to describe; and I can assure Mr. Britten that I had no wish to disparage his remarks on the Cranesbills, but to cast a mite into the treasury of useful knowledge by pointing to a fact not generally known. Mrs. Watney, it seems (as pointed out by W. T., Ipswich), has committed the same error as myself in *lumping* Erodium with Geranium. I beg pardon for having committed the blunder of having substituted *stigmas* for *styles;* it should have been persistent or indurated styles; but the fact is, it is no easy matter for a person like me to put the *spade* aside and take the *pen* to write an article on *structural* botany. In addition to my remarks, I may add that the coiling of the styles of Erodium is not a good character, as they will not coil at all in damp weather, and if previously coiled will unroll themselves in cold, damp weather. I have before me about a dozen of the carpels of Erodium lying on the surface of a pot of sand, all as straight as a dart, each of which had, when placed there, from six to twelve coils. These, when carried into a warm room and *warmed* before the fire, will instantly *recoil* themselves. It is a fine sight to gather a lot of carpels of Erodium, bring them in and place on a warmed plate: they will all commence twisting and writhing like tortured snakes; and so true it is about the seeds twisting themselves into the soil, that I have generally found that seeds of Erodium or Pelargonium sown in pots, under glass, will always come to the surface, and bury themselves in their own way.—*T. Williams, Ormskirk.*

Wasp, Local Name of.—"Look-ee, sir, that ere 'apple-drain' will sting ee." So quoth a buxom Devonshire farmer's wife near Chawleigh the other day. This appellation is common in those parts.—*H. P.*

Flight of Birds.—In answer to the inquiry of your correspondent T. Southwell, in the September number of Science-Gossip, I venture to append the following extracts:—"Hawks and many other birds, probably, fly at the rate of 150 miles an hour; an eider-duck at 90 miles an hour. Sir George Cayley computes the common Crow to fly at nearly 25 miles an hour. Spallanzani found the rate of the Swallow at about 92 miles an hour; while he computes the rapidity of the Swift to be nearly three times greater. A falcon, which belonged to Henry IV. of France, escaped from Fontainebleau, and in 24 hours after was found at Malta, a distance of not less than 1,530 miles; a velocity nearly equal to 57 miles an hour, supposing the Falcon to have been unceasingly on the wing. But as such birds never fly by night, and allowing the day to be at the longest, his flight was, perhaps, equal to 75 miles an hour. If we even restrict the migratory flights of birds to 50 miles an hour, how easily can they perform their most extensive migrations! Fair winds may, perhaps, aid them at the rate of 30 or 40 miles an hour; nay, with three times greater rapidity."—(*Dr. Fleming's "Philosophy of Zoology."*) "Few birds pass over so great an extent of surface, in the same time, as the Swallow, who flies in the usual way at the rate of a mile in a minute. There is one little bird, however, the Swift, which appears to excel all others in the rapidity of its movements. An eminent naturalist, who has assiduously studied the habits of this bird, estimates its motions as being equal to 250 miles an hour. Thus, we see that the speed of a bird's flight is not equalled by the fastest railway train, which is little more than half the velocity of the Golden Eagle, estimated to pass through the air at the rate of 140 miles an hour. Of all birds, the Condor mounts the highest into the atmosphere. Humboldt describes the flight of this bird in the Andes to be at least 20,000 feet above the level of the sea. The power of pigeons on the wing is proverbial. In 1850, on October 6, Sir John Ross despatched a pair of young pigeons from Assistance Bay, a little west of Wellington Sound; and on October 13, a pigeon made its appearance at the dovecot in Ayrshire, Scotland, from whence Sir John had the two pairs of pigeons which he took out. The distance direct between the two places is about 2,000 miles."—(*J. Timbs's "Animal Life."*) "The specific gravity of the body of birds is concerned but in a very subordinate manner with their aptitude for aërial locomotion. Their fitness seems to depend on other circumstances; such as the great lightness of their feathers, owing to the air which they contain; the little tendency of water to adhere to them when exposed to rain; their form and arrangement, so admirably adapted for the purpose of impulse; the high temperature of the body expanding the contained air; and the immensely powerful muscles, the pectoral belonging to the wings. Is not the power of flight of each species in a great measure proportioned to these conditions?"—(*Dr. John Davey.*) I hope the above will satisfy the wishes of your correspondent, and that I have not trespassed too much on your valuable space.—*W. F. Price.*

Bramble Brand.—I have been struck with the excessive prevalence of this fungoid growth during the present autumn. In some neighbourhoods I see scarcely a leaf which is free from traces of it. I presume some climatic peculiarity will account for it. If any reader care for any, I shall be happy to send him some.—*H. P.*, 12, *Bedford Circus, Exeter.*

The Cuckoo.—A farmer in the north of England caught two young cuckoos, and put them in the same cage. They agreed quite well until the time that it is said these birds migrate, when they fought so violently that the farmer was glad to release them. Will any reader of the Gossip kindly explain this? —*J. Johnson, New Jerusalem Schools, Salford.*

Cement wanted.—Can any reader supply me with a receipt for, or the name of, a cement which could be used "*without heat*" to fasten sections of teeth to slips of glass, in order to undergo the last stage of grinding? I have some injected teeth, and have found that placing the sections in hot balsam to make them firmly adhere to slips of glass, makes the injection permeate the coats of the vessels, leaving the whole an indistinct mass. If any one could kindly recommend something, it would greatly oblige—*G. C. Gowan*, 20, *Beauchamp Square, Leamington.*

Atmospheric Phenomenon.—I have frequently observed a very interesting appearance in the sky after sunset, of which I have never seen any account in scientific books, and which I think is worthy of the notice of the readers of Science-Gossip. About three-quarters of an hour after sunset on a clear evening, whilst the west is just losing the last glow of the departing sun, there arises in the east, exactly opposite to the place of the setting sun, an arch of shadow thrown upon the sky. Though the edges of the arch soften down gradually into the sky above it, it is, nevertheless, very clearly defined. The summit of the arch is about 20°, or a little more, above the horizon. As the twilight fades away, the shadow is gradually absorbed into the general darkness of the night. It seems to me that this arch of darkness is the shadow of the earth projected upon its own atmosphere. It is most frequently to be seen during the winter months, especially when a clear frosty night is coming on.—*J. S. Tute.*

Honour to Whom Honour is Due.—In the *Annals of Natural History*, for September, 1857, the following remarks occur, by John Denis Macdonald, Assistant-Surgeon H.M.S. *Herald*. The article is entitled, "Observations on the Microscopic Examination of Foraminifera, obtained in deep-sea bottoms at the Feejee Islands." "I could not help remarking also that the foraminifera themselves closely resembled some of the forms entombed in the chalk-formation of England, and there can be little doubt that these facts will prove of considerable importance in a geological point of view." Hence one important result of the late deep-sea dredgings was foreshadowed by Dr. Macdonald twelve years ago.

Cranesbill Seed.—I think your correspondent "W. T., Ipswich" will find that the carpels of the Herb Robert (*Geranium Robertianum*) are furnished with long *awns*, which do, as I said in my note to Science-Gossip, page 191, act like a screw in fixing the seed into some chink or crevice where it may happen to rest. I simply instanced it as one of the very many proofs given us in Nature of the wise provision made for the dispersion of different plants, as I might have called attention to the way in which the gorse-pod projects the seed, or the dandelion pericarp, crowned with down, becomes wafted by the wind far and wide. I fancy the mistake has arisen from my use of the word "screw," as it gave rise to the idea that I intended to say the awns of the Cranesbill were *spirally* twisted, whereas, to be quite correct as to terms, I suppose I should have written "the awn becomes recurved when it separates from the central axis," and is not "spirally twisted as in *Erodium*." I think I ought to explain that my little note in the *August* number of Science-Gossip was written *à propos* of a notice of the Herb Robert by Mr. James Britten which appeared in the *June* number, and was sent by me to the office long before Mr. Britten's admirable paper on Cranesbills appeared in the *July* number. Had I seen his observations on the "peculiar method of dispersing seed confined to the Geraniaceæ," I should not have alluded to the subject at all.—*Helen E. Watney.*

Admiral or Admirable.—By which of these names should we call *Vanessa Atalanta?* Admiral seems almost like an abbreviation of Admirable; and yet, so far as I know, the former is the earliest title. Thus on the side of Admiral we have Ray, 1710, and Petiver, 1717; while for Admirable may be quoted Albin, 1720, Wilkes, 1773, Harrison, 1775, Shaw, 1806, and Rennie, 1830. But now Admiral seems the popular name. What can it mean? There is some sense in Admirable, as implying excellency. In Germany, I may add, *Atalanta* is also known as the Admiral.—*W. W. S.*

Blue-bottles again.—On page 234 of Science-Gossip for 1868, I gave an account of what I considered a plague of blow-flies, and I have now to describe a greater plague. Last year the surrounding field was cut as hay, and I thought that might have attracted them; but this year the field has been pastured—so that I am at a greater loss to account for their numbers, or the attraction which has induced their presence at the Vicarage, or in my study, a S.-W. upstairs room. Up to the 20th of August, I took no notice of them, except to allow my young cat to climb the windows and catch them, for which diversion she has both skill and relish; but on that day their numbers alarmed me, and in my study alone I caught 727, and 400 the next day; and the numbers then varied from 491 to 96 in the day; so that on 15 days between Aug. 20 and Sept. 6, I caught no fewer than 3,919. Windy weather then set in, and Sept. 7th and 8th, none; 9th, 45; 10th, 35; 11th, 16; making in three weeks, 4,015. They then pretty nearly disappeared, until Oct. 6th, when I caught 100; and to-day, Oct. 9th, 100 more. On one or two windy days, when no flies were in the windows, I found numbers in the little crevices in the brick-work of the walls outside. If any reader of Science-Gossip can tell me the cause of their numbers, the nature of the attraction, and the means of preventing or getting rid of them, I shall be much obliged. I may add that there has been the same diversity in size that I noticed last year, the flies varying from the size of the small humble bee to that of a small house-fly; the great majority of the blue metallic hue, but on some days a large number of the green hue; and I noticed also the same absence of the house-fly, there having seldom been 4 or 5 in the windows at a time. The preference for my study (except the sunshine) I cannot understand, as it is upstairs, S.-W., and all the kitchen offices are downstairs, N.-E.—*H. O. S.*

The Badger, the Otter, and the Black Rat.—I have received many interesting letters regarding the present distribution of these animals, but am still in want of accurate information from the Midland Counties of England, and from Scotland.—*Robert Morton Middleton, Jun., The Bank, West Hartlepool.*

Bees.—"D.D.B., Cantab.," need be under no fear about the drones produced by his hybridized (?) Ligurian; as, acording to the law of Parthenogenesis, the drones will be pure Ligurians, although the workers will be mixed; that is, some will be black, others coloured. I have kept Ligurian bees since 1867, and a friend of mine since 1865, and, from my own and his experience, I have great doubts as to the Ligurian being a different *species*. I think it must be only a variety, and one reason for thinking so is, that, when allowed to swarm naturally, the young queens very frequently, if not always, become crossed with black drones, even when Ligurian drones exist in the immediate vicinity in great numbers; and it is only with great difficulty, and by artificial means, that the species, or variety, whichever it may be, can be kept pure in the neighbourhood of black hives. The hybridized (?) queens are quite as prolific as the pure ones, and so are their offspring. Now, it is well known that undoubted hybrids (such as the mule) are incapable of reproduction. Again, this year, many young queens, produced in the natural way by a pure Ligurian queen, have been quite black, without the characteristic vermilion stripes, although every worker, observed in the hive, was marked. There are great variations as to beauty of colouring in different Ligurian bees, both queens, workers, and drones; I have also remarked more or less of colouring on many of the so-called black bees. I should be very glad if the question of Ligurians being a distinct species, or only a variety, might be thoroughly discussed in your columns. An account of the success or otherwise of those who have attempted to propagate Ligurians, would, I have no doubt, be very acceptable to many readers of Science-Gossip. To show the difficulty of keeping Ligurians pure, I may say that my friend above mentioned, in 1866, raised 7 queens, all of which were hybridized(?); in 1867, 11, of which 7 were purely impregnated; in 1868, 8, only 2 pure; in 1869, 11, of which 2 only again were pure. I may just state that he resides in a first-rate honey-producing district, and, with the exception of two or three hives kept by the clergyman, who lives a field or two off, there are no bees kept within a circle of about a mile. Of course there might be escaped bees established in the woods near. In 1868 I believe he had no bees but pure or hybridized Ligurians, and I think where natural swarming was permitted, every young queen has been hybridized (?). My own experience coincides: but as I am surrounded by black bees, my case is perhaps not a fair one.—*F. George, Kirton in Lindsey.*

Cats and Starfish.—To those who may not be so successful as "A. Y.'s" neighbour in inflicting capital punishment on intruding cats, by strewing their garden with pieces of starfish, the following may reveal the probable cause of failure; and may serve as a word of warning to those who collect these curious creatures for other purposes than to destroy their neighbours' cats:—In August I collected some half-dozen starfishes—two or three of them being the common Five-finger Star. Intending to preserve them, I spread them, without any preservative, on a board, and laid them in the sun. They had lain but a day, when I had to go home; so I packed them up, partly dried as they were. When I got home, I put them in my bedroom, so that nothing might befall them. Experience teaches. Instead of the cat being scared by them, in the morning, the first chance she got of the door open, she scented them out, and made her breakfast of a ray or two from at least the half of them—the best ones of course. She immediately showed symptoms of being poisoned, vomiting badly. Such havoc had been made among my specimens, I threw them on the dunghill, where another cat traced them, and was soon seized in the same way as the first. They seemed little or nothing the worse after getting it all fairly off their stomachs.—*J. Dunlop.*

Bees Deserting.—Can any of your correspondents give me information as to certain casualties which have happened to our bees? We have kept bees three years; our bee-house holds eight hives, and we have, until this season, been successful. About the end of June this year we had five swarms; all were hived well; but they, with one exception, deserted the hives altogether, some after two or three days, and another after working in the hive about fourteen days, and making several nice pieces of honeycomb; where they went to we could not ascertain. The hives we use are Pettitt's Collateral Hive and Neighbour's Improved Cottage Hive, all perfectly sweet and clean. What I want to know is, whether the circumstance has happened in other quarters, and if so, what precaution should be taken against its future occurrence? The only swarm that remained was the Ligurian bee, and they have not half filled the hive with honeycomb; my neighbour's bees also have scarcely any honey this year.—*Wm. Balchin.*

Parasitical Diptera in Aphides.—About the beginning of August some sweet peas in my garden were covered with fine plump aphides of the usual green colour. Soon a change took place, as by magic. They became dry and brittle, and fixed to their places, but had not in anywise shrunk in form or size. They had a ghastly look. On opening them, a yellow maggot was seen quite filling the abdomen. I placed some in a pillbox, and on opening it after a while, there was a hole in each aphis, and a lively lot of two-winged flies, of small size, were running about. Can any of your correspondents say if the matter has been observed or described before, and oblige—*J. B. Keene?*

Cleaning Shells.—Has Owen T. Williams tried rubbing them, first with a rag dipped in diluted nitric acid, and afterwards with wet powdered pumice-stone on a piece of chamois-leather, finishing off with rottenstone?—*A. G.*

Preventive for Whooping-Cough.—In your July number, your correspondent "C. E. F., Redland, Bristol," gives an account of a Sussex recipe for whooping-cough, by placing some of the hair from the cross on a donkey's back between bread-and-butter. Perhaps it will be further interesting to state a remedy far more efficacious, in use in some parts of Dorset, where infants and young children are placed on the cross of a donkey's back to have their *first* ride. This is considered to be a preventive to their ever getting the complaint.—*H. N.*

Cure for Toothache.—In the same locality as mentioned above a very singular cure for toothache was once, to my own knowledge, practised. It consisted of wearing round the neck, in a linen bag, one fore and one hinder claw of the Mole (*Talpa Europæa*). The superstition was further heightened by the *necessity* of the claws of the female mole being used for males, and the reverse for females.—*H. N.*

NOTICES TO CORRESPONDENTS.

N. N. (Hamburg).—If full name and address be forwarded, we will send report and rules of the Quekett Microscopical Club.

F. W.—Had we formed a good opinion, probably you would have seen some notice.

H. H. W.—Most likely *Saprolegnia ferox*.

Charlotte B.—A specimen of *Erica cinerea*, in which no flowers have been produced, but in their place close tufts of purple bracts. We have met with a similar occurrence in *Calluna vulgaris* and other plants.—*M. T. M.*

W. G. S. (Dublin).—The barren form of *Xylaria hypoxylon*, very common.

F. I. W.—The leaf is elm, and the fungus *Dothidea ulmi*, very common.

H. F. P.—The only cheap book on British Lichens is Dr. Lindsay's popular history, at 7s. 6d. (Routledge).

F. W. Markatt, 6, Kemble Street, Kensington, will please to send correct address.

L. F.—We could not attempt to say what it is from the vague description. The Convolvulus Hawk-moth is not common.

S. M.—Drawings were first made from the animals, which were then grouped and photographed.

A. S. H.—Could you expect us to name from description what such men as Sir W. Hooker, Dr. Daubeny, and Professor Harvey could not determine after seeing the object?

M. H. O. B.—More than one similar case is recorded in the present volume.

F. J. D. H.—Is there so much difference between September 28th and October 1st to make it worthy of record that you saw a glowworm at the latter date?

H. W. H. should look over "Exchanges"; American Diatomaceous earth has been offered for six months past.

H. J.—In the first and second volumes of Science-Gossip you will find accounts of parasitic thread-worms.

W. W. S.—The Coffee-borer of Southern India is *Xylotrochus quadripes*, Chev.—*F. M.*

M. S. B.—Small galls caused by insects.

J. W. G.—The price of turntable is about 6s. (Baker, High Holborn). Huxley's elementary book on Zoology, published by Macmillan at about 4s. 6d.; and Cooke's "Structural Botany" (Hardwicke, 1s.).

A. H.—We did not deny the existence of a large Octopus (see Science-Gossip, 1865, p. 50, "man-suckers"); it is simply asserted that there is no such thing in nature as the "Devil-fish" of Victor Hugo, which is as much a romance as a griffin, or a centaur, being a compound of several creatures.

H. M.—Put in a piece of green sea-weed, and don't change the water at all; it should never require it, if properly balanced.

W.—We could find no insects when the box reached us.

T. P. F.—It is a fundamental rule with us not to insert lists.

A. T. B.—We answered your query under these initials in our last number.

T. P. F. (Kimbolton).—We do not pretend to insert every query that we receive; for the selection we use our own discretion, and must regard its exercise as one of our privileges.

W. M. M.—A dashing communication. How would you like the dashes printed? Certainly a curiosity—in its way.

M. G. C.—Busk's "Catalogue of Polyzoa" is out of print. His papers on zoophytes in consecutive volumes of the *Quarterly Journal of Microscopical Science* have not been published separately.

H. F. P.—1. Abortive form of crustaceous lichen. 2. Barren squamulose lichen. Send fruiting specimen. 3. Form of *Borrera pulverulenta*. Lichens sent for identification should bear apothecia.—*W. C.*

T. W.—1. *Ptilota plumosa*. 2. *Sporochnus villosus*.

C. W.—All the plants you name are commonly found with white flowers. For the principles which govern variation in colour, see Balfour's "Manual of Botany," pp. 326-329.

J. G. S.—What dried plants?—Mosses, algæ, lichens, or flowering plants? Try Wheldon's, Great Queen Street, W.C.

EXCHANGES.

Deposits. — Wanted a small quantity of Barbadoes, Trinidad, Monterey, Bermuda, and Nottingham, U.S., Diatomaceæ Deposits for others or recent gatherings.—B. Taylor, Hon. Sec. Whitehaven Scientific Association.

Palates of *Trochus zizyphinus* and *T. crassus* (mounted, opaque, or transparent) for good mounted objects, or material.—G. Moore, Dereham Road, Norwich.

Dried Plants from Derbyshire, Lancashire Coast, &c., for other rare plants.—W. [H., 1, Edgar Villas, Parchmore Road, South Norwood, S.E.

Platypria Echidna (Coleoptera). — A few mounted in balsam, others unmounted, Sections of Porcupine Quill, and Fossil Diatoms (Bohemia) mounted, for good mounted objects.—J. G. H., 152, Holland Road, Kensington, W.

Lepidoptera.—*P. chrysorrhœa, E. lanestris, C. spartiata*, &c., for *Pieris cratægi, A. aglaia, M. athalia*.—H. Miller, jun., St. Lawrence, Ipswich.

Spicules of *Gorgonia flabellata* and other varieties, mounted, for good slides.—W. F. Haydon, 2, London Street, Norwich.

Winged Seed of Eccremocarpus. — Send stamped and addressed envelope (any object of interest acceptable).—J. Shelton, 52, High Street, Bedford.

Death's-head Hawk-moth.—A few good Chrysalides for mounted objects.—Send lists to "Beta," Collegiate House, Wooton Bassett.

Palates of *Trochus umbilicatus*, Sections of Cocoa-nut Shell, and other mounted objects, for others.—H. W. H. Cox, 152, Holland Road, Kensington, W.

Polycystina, *Grammatophora marina*, and other Diatoms (mounted) for Entomological Slides.—J. W. S., 18, Crown Park, Montenotte, Cork.

Fossilized Pine, showing glandular ducts.—Send stamped and addressed envelope to John Ratclyffe, Mytholmroyd, *via* Manchester.

Ferns Wanted.—Local English for *Ophioglossum Lusitanicum, Asplenium marinum, A. ruta muraria, Ceterach officinarum, Polypodium vulgare*, all good plants.—A. D., Dawlish, Devon.

Trifolium Molineri, *Bocconi, strictum*, and other rare British Plants, for other rare species or varieties.—R. V. T., Withiel, Bodmin, Cornwall.

Fossils from Silurian Limestone, Wren's Nest, near Dudley, offered for four good slides of Diatoms.—G. Bowen, 95, Hampton Street, Birmingham.

Pupa of *C. elpenor* and *bucephala*, and larva of *B. rubi*, for pupæ or imagos.—Alfred Pickard, Wolsingham, Darlington.

Achnanthes longipes (mounted) for any other Microscopic object (mounted or unmounted).—E. M., 22, Irish Street, Whitehaven.

British Butterflies and Moths for Foreign Shells, Fossils, or Minerals.—B. A., Post-office, Faversham.

BOOKS RECEIVED.

"Report on Epidemic Cholera in the Army of the United States during the year 1866." Washington. 1867.

"Report on Epidemic Cholera and Yellow Fever in the Army of the United States during the year 1867." Washington. 1868.

"The Gardener's Magazine." Part XLVI. October, 1869.

"The Canadian Naturalist." Vol. III. Nos. 5 and 6. June and December, 1868. Montreal: Dawson Brothers.

"Le Naturaliste Canadien." No. 10. September, 1869. Quebec.

"The American Entomologist." Vol. I. No. 12. August, 1869. St. Louis: R. P. Studley & Co.

"Scientific Opinion." Part XI. October, 1869. London: Wyman & Sons.

"The 5, Bow Churchyard Magazine." No. 6. October, 1869.

"The Monthly Microscopical Journal." No. 10. October, 1869. London: Robert Hardwicke.

"The Popular Science Review." October, 1869. London: Robert Hardwicke.

"Land and Water." Nos. 192, 193, 194, 195.

"The Method of Teaching Physical Science in Schools," by the Rev. W. Tuckwell, M.A.

"The Quarterly Journal of the Folkstone Natural History Society." No. 4. October, 1869.

"The Canadian Entomologist." Vol. II. No. 2. October, 1869. Toronto: Copp, Clark, & Co.

"Reade's Prism for Microscope Illumination, &c.," by Samuel Highley, F.G.S.

"The Sixteenth Report of the Brighton and Sussex Natural History Society." Adopted September 9, 1869.

"The American Naturalist." Vol. III. No. 7. September, 1869. Salem: Peabody Academy of Science.

"The Chemical News," for October 22, 1869. London: Boy Court, Ludgate Hill.

"The Quarterly Magazine of the High Wycombe Naturai History Society," for October, 1869.

Communications Received.—C. B.—H. S.—J. H.—H. W. H.—S. M.—S. J. B.—H. F. P.—G. B.—J. S.—J. S. T.—A. S. H.—A. A.—J. J.—F. T. M.—M. H. O. B.—R. H. N. B.—J. G. N.—T. P. B.—J. R. S. C.—R. C.—J. B.—C. R. B.—G. C. G.—J. W. G.—H. E. W.—J. L. P.—F. J. D. H.—H.—T. W.—A. H.—Dr. M.—R. V. T.—W.—G. W.—A. D.—H. J.—W. W. S.—M. S. B.—M. P.—J. W. G.—T. W.—T. W. W.—C. P. S.—W. F. P.—H. S.—W. W.—R. H.—W. B. C.—G. L. B.—B. T.—D. D. B.—H. H. M.—A. T. B.—G. M.—W. R. H.—W. J. H.—J. D.—F. W.—J. B.—J. S.—R. E. O.—H. M.—L. F.—A. A.—J. B. K.—R. M. M.—A. S. G.—H. W. H. C.—W. G. S.—J. W. S.—J. R.—H. S.—F. I. W.—I. G. H.—H.—A. G.—C. O. W.—A. J. D.—G. H. F.—A. W. W.—W. B.—H. O. S.—H. M.—W. M. M.—R. B. S.—B. A.—M. G. C.—J. G. S.—C. W.—A. P.—H. N.—J. S.

WILD FLOWERS FOR DECORATIVE PURPOSES.

I AM very glad that Mr. Holland has directed attention to this subject, which is one of interest to the botanist, as well as of importance to the gardener. By way of furthering his object, I will supplement his remarks by naming a few additional claimants among our wild flowers to a place in the garden, and by hinting at another way in which they may be made to contribute to our enjoyment.

Not long since I was visiting the gardens at Dropmore, Bucks, and was pleased to see a large space of rockery and border devoted to wild and old-fashioned flowers. Perhaps the most ornamental was the Welsh Poppy (*Meconopsis Cambrica*), with glaucous foliage and pale yellow poppy-like flowers, which sprang up among the rockwork and by the sides of the paths in great luxuriance; but there were also the Bloody and Meadow Cranesbills in masses, with Foxgloves, Campions, Bellflowers, Wild Pansies, Aaron's Beard (*Hypericum calycinum*), Heaths, and many more which have escaped my memory.

I am a great admirer of "foliage plants," and I do not at all overlook the advantages attendant on the modern system of "ribbon bordering," especially as the contrasting yellow Calceolarias with scarlet Geraniums is now left to the vulgar, to whom such a meretricious mixture commends itself. But it seems hard that, in large gardens at any rate, there should not be some space reserved for our old favourites, who gladdened the hearts of our forefathers long before the many-shaded *Coleus* and the red-veined *Iresene*, and the funeral-plume-like *Perilla* were known or thought of. What can afford greater variety and brilliancy of colouring than a row of Snapdragons? which seem inexhaustible in their variations, but which are at present sadly neglected. Phloxes, Fraxinella, Pentstemons, Michaelmas Daisies, and a host of others seem dismissed from many gardens; yet what is there to take their place?

Among the wild flowers which Mr. Holland refers to but slightly, I find the Columbine, for which I must put in a special word. What a splendid effect would be produced by clumps of this lovely flower placed at short distances along the back of a long border! The shades of colour in the flowers are so beautifully distinct that, in this respect, Columbines are preferable to Snapdragons; for in them we have every variety of blue—from pale slate-colour up to a rich purple-black,—and this is entirely wanting in the latter plants. Columbines, too, are certainly more graceful than Snapdragons in their mode of growth. I have seen in a small garden clumps of Columbines, with pure white, stone-blue, azure, purple, brown, pink, red, crimson, and almost black flowers. When the blossoms are faded, the tall stems may be cut down, and the leaves hidden by the plants which may be placed in front of them.

Mr. Holland mentions the Bird's-foot Trefoil (*Lotus corniculatus*) as a plant of merit; but residents in chalky districts will confirm my assertion when I say that it is in no way to be compared with the Horse-shoe Vetch (*Hippocrepis comosa*). This latter plant grows in masses in suitable situations, and the handsome chaplets of orange flowers, far richer in colour than those of the *Lotus*, are surpassingly handsome: its habit of growth, too, is preferable to that of the latter plant, being more compact, and the blossoms are much more numerous. On the chalky slopes at Hughenden Manor, Bucks, the *Hippocrepis* grows intermingled with the blue and red-flowered varieties of the Larger Milkwort (*Polygala eu-vulgaris* of "English Botany"),

and the effect is very striking, especially when the sun shines upon the banks.

The Herb Robert may be introduced into a garden with very pleasing effect. It will grow almost anywhere, and is useful as a sort of groundwork, or setting, for choicer plants. A white-flowered variety is in cultivation, which is very pretty; the foliage, when relieved by the pure blossoms, appears darker than usual, and the contrast is very good.

The Yellow Toadflax (*Linaria vulgaris*) is another handsome plant, and many of the St. John's Worts would repay the trouble of cultivation. For rock-work, the "Creeping Jenny," as the London flower-sellers call it (*Lysimachia Nummularia*) is not to be despised; and other British members of the genus may be grown with good effect.

The tall Yellow Loosestrife (*L. vulgaris*) is not uncommon in London gardens, under the name of "Orange Bovena," and the Yellow Pimpernel (*L. nemorum*) flourishes well in a damp corner.*

But now I must pass on to the other way of which I spoke in which wild flowers may be made useful, and that without the trouble of cultivation. I mean in the making of bouquets, or nosegays, to use the pleasant old-fashioned word. In this particular they really have some advantage over cultivated flowers, as they are less stiff and massive, and consequently fall into more graceful positions. They vary, too, so beautifully and characteristically with the seasons: in Spring, we have chiefly soft and gentle hues, suitable, as it seems, to the gradual waking up of Nature; and then, for a nosegay, what can be better than a thick ring of Primroses, from which the leaves must on no account be omitted, surrounding a bunch of graceful Windflowers, which droop over them? Then a little later we may have Bluebells, Stitchworts, Cowslips, and Herb Robert, with here and there the delicate green of a young fern-leaf to harmonize them. Thus we pass on to Summer, gathering many a bouquet by the way; and Summer introduces us to a richer and deeper colouring, a more developed brilliancy. What among garden flowers can exceed in splendour the Scarlet Poppy? and a lovely nosegay is obtained when this is combined with the white of the Moon Daisy, and the intense blue of the Corn-flower, the whole intermingled with sweeping Brome-grass, and feathery Bent-grass, and Hair-grass, with here and there a spreading spike of English Oats, which for ornamental purposes are far preferable to the Dutch variety, with one-sided spikes.

One of the reasons why wild flowers make more elegant bouquets than cultivated ones is that the blossoms are usually single, and grow loosely on their stems, while many garden flowers grow either in heads or are double. This may be seen at a glance by any one who will note the plants most popular in summer gardens, — Geraniums and Verbenas in almost endless variety, Calceolarias, Roses, Heliotropes, and other crowded-flowered species. In making a wild-flower nosegay, too, one has always the opportunity of gathering and adding as one goes—here a spike of grass, there a green spray or fern-frond; while in gardens, the former at least is usually wanting.

Another pretty ornament may be formed by filling a soup-plate or some similar vessel with Dog Roses, cut moderately short, and selected so as to embrace a good many buds, which will expand in the course of a day or so. Later on, when the Moon Daisies have disappeared, their kinsmen, the yellow Oxeyes, can take their place in the bouquet above described. And, as summer approaches its prime, we may get Heaths and Harebells, with the Upright St. John's Wort (*Hypericum pulchrum*),—a lovely mixture, only Heaths soon fade in water. Then, by degrees, the flowers disappear, and their colour is supplied by the mature glow of the Autumn leaves, and the ripe glory of the hedge-fruits. Many a bouquet can we select from them: here a yellow or red bramble-leaf; there the dark metallic-looking brown of the Black Bryony, with feathery Clematis, and bright Rose-hips, and a few late flowers, Ragwort, and Harebells, and Scabious, placed with them.

But space forbids me to dwell upon all the combinations of colour which our wild flowers present. Many, which are lovely when viewed *en masse* in their native haunts, would fail to attract if brought under cultivation. A field golden with Buttercups, or a river bank glorious with Marsh Marigold flowers, is a sight of no ordinary beauty, although common enough; and a meadow purple with Fritillaries is far more beautiful than a clump of the same flowers in a garden. Poppies among the corn are not pleasing to the farmer; but who, with an eye for the beautiful, can help admiring them? Still, we should scarcely welcome them to our borders. Desirable then, as it is, that we should bring into cultivation many of our British plants, it is yet more so that we should study them as well in their wild and unchecked luxuriance, admiring the ever-blooming, ever-changing garden which is spread over the length and breadth of the land.

Royal Herbarium, Kew. James Britten.

* Why is not the White Bryony more frequently cultivated? I have only once or twice seen it in a garden; but as a climber it is, to my mind, equal to many a favourite, and should certainly be tried.

Before this number is in the hands of our readers, the majority of them will have heard, or read, that the Queen has been pleased to command that Dr. J. D. Hooker be admitted a Companion of the most noble Order of the Bath. May he live long to honour the order to which he is admitted as an honour to himself!

THE INVASION OF LADYBIRDS.

ON the first of last month (September) a friend, who has a garden in the suburbs of this town, brought me some young shoots from his apple-trees clustered over with the dark grey Aphis (*A. lanigera*), which gardeners call "American Blight." The cottony fluff which surrounds these aphides was mostly gone, but it had been originally very thick, and nearly half an inch long. My friend also brought me about fifty specimens of the large lady-bird, *Coccinella septem-punctata*, which, he said, swarmed upon the same apple-trees in such profusion as he had never seen before. I have since been to his garden, and kept some of the aphides and lady-birds under a glass-shade for a fortnight.

On every infested spray there were four distinct forms of insect life besides the ladybirds, viz.:—1. The unmistakable dark-grey aphis, about $\frac{1}{16}$ of an inch in length. 2. A creature of similar shape, but of a reddish brown colour, only half the size, and not nearly so abundant. 3. A black fly about the size of the grey aphis, or a little larger, and with four very delicate transparent and iridescent wings. 4. A minute whitish creature running about in a lively manner, possibly a mite of some sort, but it soon disappeared in captivity.

The dark-grey aphides have long cottony hairs growing from all parts of the abdomen—a row of hairs on each segment—which break off close to the body at the slightest touch. Globules of honey-dew may often be seen exuding from their tails. They cluster thick together, preferring the undersides of the branches, and, with their heads downwards and their abdomens tilted up, thrust their rostra through the pores of the outer bark, and suck the descending sap.

I imagine that the injury thus done to the vessels of the inner bark checks the downward current of the sap-stream, and that the cankerous swelling and cracking of the bark are produced by its overflow. Wherever these aphides have been numerous and remained long the leaves are withered, and the bark cankered. But Nature preserves her balance. The season which favours the aphides favours also the seven-spotted ladybird, and these pretty beetles soon find out their prey. The larva of the ladybird is supposed to be much more voracious than the perfect insect; but no larvæ were to be found in my friend's orchard, and yet the aphides which, one Sunday morning, seemed to have swathed all his apple-trees in fine cotton, the next Sunday morning, when he took his usual walk to the garden, had almost disappeared. The cottony fluff was gone, most of the branches were cleared of the invaders altogether, or only spotted with their bleached and empty skins, while the red-coated *Coccinellæ* hung upon every leaf and spray.

The question may be asked, did the ladybirds eat the aphides, or did the aphides cast their skins, become winged creatures, and fly away?

The evidence for the eating theory is, that the ladybirds gathered on the very same trees as the aphides; that the aphides disappeared about the time that the ladybirds arrived; that large numbers of empty skins adhered to the boughs and lay on the ground beneath; that when sprays, covered with aphides, were inclosed for a fortnight with a number of ladybirds, the latter were alive and well at the end of the time, while, of the former, nothing remained but skins; and that on several occasions a ladybird was seen with its mouth in contact with an aphis, and its jaws moving.

I am not able to say at what hours the ladybirds took their food. I never saw them fairly and unmistakably at work. In the day-time they would often run about a good deal, crawling over the masses of aphides as if they were only little heaps of unattractive rubbish. Towards evening they would cluster together and lie quiet. Perhaps they went to sleep. Yet day by day, or night by night, the aphides diminished, and in fourteen days they were extinct.

There is another question to settle. Are these swarms of ladybirds immigrants into this country from over the sea, or are they bred in the hop-grounds? We have no hop-grounds in Leicestershire, nor within a hundred miles of us, I think. Persons who have been this summer on the eastern and southern coasts assure me that clouds of ladybirds were seen to come in from the sea, while others alighted in swarms upon ships in the Channel; and that the shore was, in some places, so thickly covered with this living and crawling red sand that it was impossible to walk without crushing scores of them at every step. In the *Athenæum*, of September 18th, is a paragraph mentioning that the Comic Almanack for 1848 represents Margate pier under similar circumstances, as if it were a not uncommon occurrence; and Loudon, in his "Encyclopedia of Gardening," alludes to the same phenomenon on the shore at Brighton in 1807. Now, if these insects migrate from the hop-grounds in search of food, why should they congregate on the barren shores? If, in their wanderings, they came to the sea and were afraid to venture out, one would imagine that they would just turn back again. But supposing that they have had a long and weary flight across the Channel, nothing seems more natural than that they should settle down on the first verge of *terra firma* to rest their little tired wings.

But *why* make this voyage across the water at all? And what brings them into Leicestershire? On either hypothesis they must have passed innumerable orchards, in which, no doubt, American blight would be common enough before they reached my friend's little garden. And they must have had

sharp eyes to find his two or three blighted apple-trees, which are nearly buried in surrounding foliage.

There is surely something not yet explained in the sudden appearance of these friendly beetles; not explained, at least, to such amateur observers as myself.

I had just written the above when the October number of Science-Gossip came to hand, with Mr. Southwell's article on "Insect Visitation in Norfolk." It contains some interesting facts, but does not seem to me to account for them satisfactorily.

Leicester, Oct. 1st. Frederick T. Mott.

[N.B.—We hope no readers will accept the challenge to enter upon a Ladybird controversy, of which there has been plenty of late. We can only promise, if they do, not to commit ourselves to publication.—Ed. S. G.]

SAGE.

I THINK it was in the August number of Science-Gossip that I promised, provided the kind Editor would accord my notes space, to give from time to time, a short account of some of our most common garden herbs: so now, in fulfilment of my word, I send up a description of our Sage (*Salvia officinalis*).

It has been said (with what proportion of truth I know not) that the inhabitants of the Celestial Empire are as partial to Sage as we are to tea, and that the Dutch once upon a time carried on a very profitable trade with the Chinese by exchanging one pound of the former for three of the latter; be this as it may, sage-tea is not nice, but I do believe in its beneficial effects in all nervous diseases depending on a bad digestion or defective circulation, since it is a most decided stomachic, as well as a powerful cordial.

There is a small variety, the "Sage of Virtue" (*Salvia minor*), which most herb-fanciers prefer for medicinal purposes to the garden Sage, and I have known it largely cultivated in cottage gardens for the sake of its healing properties, the other Sage being only used as a culinary herb by those who grew both kinds.

The ornamental character of some of the genus must be well known to all lovers of flowers, and those of my readers who have visited the Ionian Islands, must surely remember the lovely blue blossoms of the *Salvia pratensis*, which grows wild in the hay-meadows.

The generic name is indicative of its virtues. It comes from *salvere* (to be well), and it was known in the days of the grand old Greek physician, who mentions it in his treatise on "Materia Medica," a work written in the second century, therefore its curative reputation is of ancient date.

The flowering tops possess greater power than the leaves, and they should be gathered just before the expansion of the corolla, dried quickly in the shade on warm days, and carefully bottled down. Sage wine is very easily made; a friend of mine used to prepare it after the following fashion:—

One ounce of fresh sage,
One pint of good sherry, and
One drachm of cloves;

to be steeped for a fortnight, and then filtered. The proper quantity to be taken twice a day fasting, is one ounce of the liquid, and very excellent it has proved in more than one case of nervous debility.

I really do not believe that the exact period of the introduction of Sage into this country is known. It is a native of the south of Europe, but has been cultivated by us for ages, and has been often made the medium of various fabulous stories, such as that the toad is partial to its leaves, and communicates to them certain poisonous properties, which the poor maligned animal does not in truth possess. There is no doubt but that Sage-leaves are to a certain extent glutinous, and therefore apt to collect insects and dust on their surface, but this gluten is not as country folk imagine, any emanation from the toad, although the creature has the power of secreting a sort of humour disagreeable to other creatures; still it does not afford the Sage plant the means of becoming a vegetable flytrap, or "catch 'em alive" apparatus.

There is always some good reason why certain herbs and sauces are used with different kinds of food; for example, the bitterness and the aroma of the Sage enables us to better digest rich fat meats. Hence we invariably find duck, goose, and pork are served with some sage accompaniment or other.

Helen E. Watney.

VEGETABLE HAIRS.

MICROSCOPISTS generally prefer resolving the indistinct markings of a few favourite diatoms, or devoting hours to the mysteries of Nobert's lines, to investigating the common objects which are scattered so profusely around them, of which, confessedly, so little is known. The minute anatomy of plants, the structure and functions of their organs, such as the stomata, glands, hairs, pollen-grains, &c., are an open field in which much work could be done and honour won, by the aid of less patience and perseverance than are now wasted in unprofitable idiosyncrasies. It may be asked whether there is any comparative uniformity of type in the hairs of plants belonging to the same natural order; and if not, in what direction does the variation tend? If any visible modifications in the hairs of the same species can be traced under different conditions of soil, temperature, or location? If it be possible to detect genera or species of plants from mere fragments of leaves, by means of their

hairs, glands, or stomata? All these are questions not yet satisfactorily answered, for want of a sufficient number of observations having been recorded. Even the examination of pollen-grains was pursued satisfactorily, and with interesting and important results, up to a certain point, and there left, no one caring to continue those researches even when well begun, and some of the difficulties removed.

In a previous number of this journal I gave a few illustrations of hairs following the stellate type, although neither complete nor exhaustive; for it was intended only to be suggestive, in the hope that other students would follow in my steps, and increase the number. On the present occasion examples are given of simple and branched hairs from a few of the commonest plants.

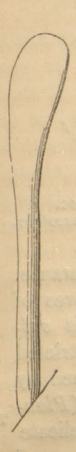


Fig. 231. *Linaria Cymbalaria.*

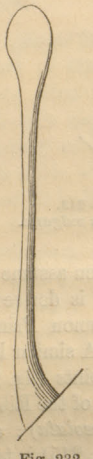


Fig. 232. *Lonicera Periclymenum.*

Fig. 231 is taken from the petal of the common Ivy-leaf Snapdragon (*Linaria Cymbalaria*), which somewhat resembles an Irish shilalagh. The next (fig. 232) follows a similar type, and is derived from the leaves of the Honeysuckle (*Lonicera Periclymenum*), except that it is more decidedly clavate. Subulate hairs bent or contorted like a meat-hook may be

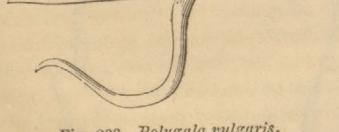


Fig. 233. *Polygala vulgaris.*

found (fig. 233) on the leaves and stems of the Milkwort (*Polygala vulgaris*), and similar hooks (fig. 234) with a longer shaft, like the "pothooks and hangers" of school-days, adorn the leaves of the Comfrey (*Symphytum officinale*).

Branched hairs are represented by the five succeeding figures, of which the first (fig. 235) may be found on the leaves of the Garden Rocket, whilst the next has the forking more decidedly developed,

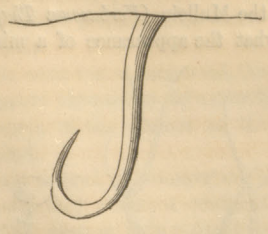


Fig. 234. *Symphytum officinale.*

and occurs on the leaves and stems of the Cat's Ear (*Hypochæris radicata*). A pretty garden plant,

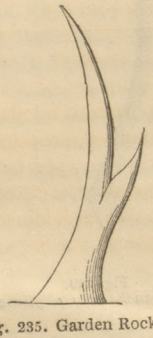


Fig. 235. Garden Rocket.



Fig. 236. *Hypochæris radicata.*

Aubrietia deltoides, offers an example of a still more

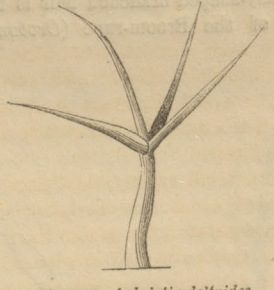


Fig. 237. *Aubrietia deltoides.*

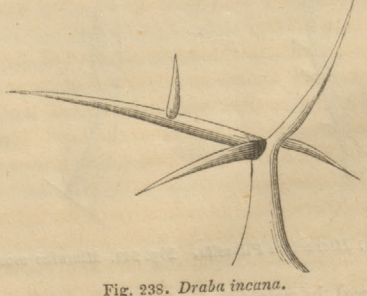


Fig. 238. *Draba incana.*

complex form (fig. 237) not uncommon on *Arabis* and other *Cruciferæ*; and fig. 238 is a hair from the

leaves of the hoary Whitlow-cress (*Draba incana*). The most decidedly dendritic hair is that of the leaves of the Mullein (*Verbascum Thapsus*), which has somewhat the appearance of a miniature tree

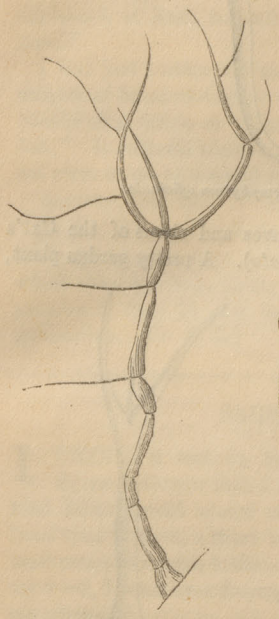


Fig. 239. *Verbascum Thapsus.*



Fig. 240. *Orobanche caryophyllacea.*

divested of foliage (fig. 239), or of a Botrytis mould without its spores.

A curiously-shaped branched hair is taken from the calyx of the Broom-rape (*Orobanche caryophyllacea*), in which the collapsing of the penultimate joint (fig. 240) imparts a singular appearance to the hair. The leaves of the Hawkweed (*Hieracium Pilosella*) is very like that of the pappus of some of the Compositæ (fig. 241), and seems to be characteristic of the genus *Hieracium*.



Fig. 241. *Hieracium Pilosella.*

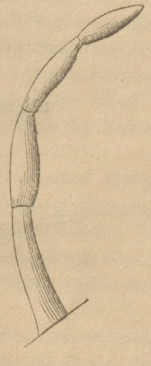


Fig. 242. *Mimulus moschata.*

Simple jointed hairs are represented by the succeeding figures, of which the first (fig. 242) is taken from the leaves of the Musk plant (*Mimulus moschata*): by collapsing of the alternate cells these

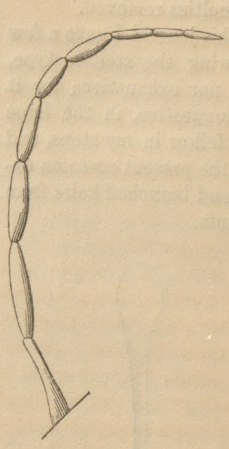


Fig. 243. *Primula vulgaris.*

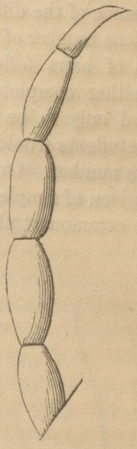


Fig. 244. *Plantago lanceolata.*



Fig. 245. *Tradescantia zebrina.*

hairs often assume a beaded appearance. Fig. 243 is derived from the leaves of the common Primrose (*Primula vulgaris*). A similar hair, more constricted at the joints (fig. 244), is furnished by the stem of the Ribwort Plantain (*Plantago lanceolata*); and a more delicate form (fig. 245) is taken from the base of the leaves of the American Spiderwort (*Tradescantia zebrina*). A beaded hair, with a pear-shaped terminal joint (fig. 246), may be found lying close to

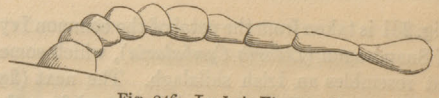


Fig. 246. *Lychnis Floscuculi.*

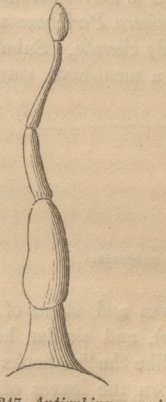


Fig. 247. *Antirrhinum majus.*

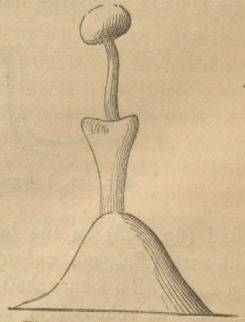


Fig. 248. *Scrophularia nodosa.*

the stem of the Ragged Robin (*Lychnis Floscuculi*); whilst a more erect, but allied hair (fig. 247), occurs on the calyx of the common Snapdragon (*Antirrhinum majus*). Glandular hairs, with a button-shaped top or apical joint (fig. 248) are plentiful on the stem of the common Mudwort (*Scrophularia nodosa*) and allied plants; in fact, these glandular hairs would in themselves afford material for an interesting chapter, of which good examples are furnished by the natural orders *Chenopodiaceæ* and *Labiatæ*. This task I leave in the hands of any one who may possess enough enthusiasm to follow my example.

Arthur B. Cole.

ANTS AS HOSTS.

ONE of the most remarkable phases in the life-history of Ants is the fact of their entertaining guests in their community; that is to say (in addition to the slaves which they carry off by force from other nests and employ as workers), there are insects, not of their own order, whom they allow to share their abode without let or hindrance. This subject has within the last few years been carefully investigated by entomologists, and from the results of their labours we gather that these guests may be ranged in three groups. The first group contains those insects which occupy the "formicary," in common with the rightful owners, in the larval condition only. Such is the handsome rose chafer (*Cetonia*), the grub-like larva of which is met with in the nest of the great Wood Ant (*Formica rufa*), feeding on the particles of decayed wood, which the Ants have brought together, and have imbedded in the cone-shaped mass which forms the hill or roof of their underground home.

In the second group are classed all those which occupy the formicary in their perfect condition, but which are not found there exclusively. To this class belong members of the Coleopterous genus *Hister*, and some of the Staphyline or burying-beetles, all of which are voluntary denizens. But, besides these, numbers of aphides or plant-lice are constant occupants of the nest, who have not sought its shelter of their own free will, but are kept there by the Ants themselves.

It is a well-known fact that Ants are particularly partial to the sweet fluid which exudes from the two tube-like orifices on the back of the aphis, and not only may they often be seen on rose twigs and elsewhere, where plant-lice abound, licking up the coveted treasure, but they actually carry the little animals into the nest and carefully tend them, with the sole purpose of using them as so many insect cows!

Among the tree-dwellers, *Lasius fuliginosus* and *L. brunneus* most commonly entertain *Lachnus longirostris*, which gets its living off the trees to which it is confined, piercing the young shoots with a beak which is quite three times the length of its own body.

Where the nests are underground, the imprisoned aphides support themselves by extracting the sap from the roots of the grasses in the immediate neighbourhood.

Sometimes, instead of transporting the plant-lice to their nests, they secure a colony of them in a kind of earthen case, or they connect them with the formicary by means of a covered way.

In tropical lands, where the aphis does not exist, its place is supplied to the ants by a near relative, a certain small Cicada.

Under the last class are included those guests which never quit the formicary: there they are born, there they pass through their several changes, and there they die. The reader will perhaps be surprised to hear that nearly three hundred species of insects, mostly beetles, are known, in Europe alone, to spend their days in this extraordinary manner. Among them are members of the genus *Pselaphus*, and more than one hundred Staphylini.

Two species of Ant, *Lasius fuliginosus* and *Formica rufa*, seem to be specially given to hospitality, as they harbour between them a very large proportion of these strange guests; but what purpose the latter serve in the colony, what relation they bear to their hosts, or what they do to earn their living—these are still among the many mysteries which have yet to be solved.*—*Taschenberg, "Wirbellosen Thiere."*

VARIATIONS IN PRIMULACEÆ.

IN reading Mr. Wallace's interesting book on the "Malay Archipelago," I have been reminded of a variation of the common Cowslip, which recently came under my observation. In the work referred to, there is a figure of the *Primula imperialis*, remarkable as being limited in its geographical range to a solitary mountain summit in the island of Java. Instead of bearing a simple scape, this magnificent species has an inflorescence three feet or more high, consisting of several whorled clusters of Cowslip-like flowers, arranged in tiers, one above another, along a common rachis. A similar inflorescence belongs to another Primulaceous plant, the *Hottonia palustris* of our own ditches. That which is the normal structure in these species is occasionally imitated

[* The only ray of light yet thrown on the subject is due to the German *savant*, Müller, who states, in regard to Claviger, a near relative of the Pselaphus mentioned above, that the Ants are wont to lick off moisture from a tuft of stiff yellow hairs, which is found on the outer angle of this beetle's elytra. But his observations do not extend beyond the fact itself.—*W. W. S.*]

by abnormal forms of congeneric or co-ordinate species. It is well known to florists that luxuriant plants of *Primula sinensis* will sometimes produce a double inflorescence, by developing a supernumerary whorl of flowers above the primary cluster. The same abnormal condition may arise in *Primula veris*; but, I think, it must be rather uncommon, as there is no mention of its occurrence in Masters' treatise on "Vegetable Teratology," recently issued by the Ray Society; and, although I resided many years in a "paigle" county, I have never met with more than a single example. I have a dried specimen of a "monstrous" Cowslip, which I found not long ago in Cambridgeshire, in which an unusually tall stem and numerously-flowered umbel are surmounted by, as it were, a smaller scape, springing from the centre of the first truss of blossom, and offering a good illustration of "terminal proliferation of the inflorescence." The plant which produced this anomaly was growing near the bottom of a shaded ditch—a rather unusual situation for the open-meadow-loving *Primula veris*—and had the appearance of being over-fed. The preceding facts are of interest as showing a strong tendency in allied species to vary in a definite direction. Their occurrence may be regarded either as the foreshadowing of species undiscovered, or yet to be; or as the reminiscence of past and extinct forms. Deviations of this kind from the common type belong to quite a different category from ordinary monstrosities, and have a special value in relation to the question of the "creation of species by variation." They do not constitute a deformity, such as is exhibited, for instance, in the retrograde metamorphosis of a flower, which is mischievous and destructive in its tendency. Their effect is not to disturb and render abortive the structural arrangements which are essential to function; but, respecting the integrity of organs, to evolve new forms capable of propagation and becoming permanent varieties. A malformation is only an individual peculiarity. A variation is a new feature which may be transmitted and become the characteristic of a race. An element of mutability lies within each specific unity, which, when evoked by unusual influences, breaks out into eccentricities more or less stable. It is an attempt at a higher differentiation than simple individualization. The one prevails among the ordinary members of a stock—*οἱ πολλοί*—subservient to the "similia ex similibus," law of hereditary succession. The other is like the exceptional production of genius, which furnishes the pioneers of new and "nobler modes of life," more in accordance with the progress and changing circumstances of the rolling world to which they belong. It is this centrifugal potentiality to diverge from the standard type, and develop new adaptations, which affords, as Mr. Darwin has pointed out, the only physical explanation of the origin of species. Accidental variations serve to indicate the direction in which new species may be looked for, and suggest to the scientific seer visions, like those of the poet,—

> "Of what the world will be
> When the years have died away."

Robert B. Smart.

BEES.

Do Bees confine themselves to a single species of plant during a flight out and home? This is a question which has long been ranged under the head *vexata*, but it is one of considerable interest. If from the time they leave the hive to the time they return to it, they really do (as a rule) stick to one kind of plant, then there can be no doubt of the important part they play in the fertilization of vegetables; if, on the other hand, they literally "roam from flower to flower" without reference to the species visited, it is clear that their usefulness in this respect has been overrated, as it must be the merest chance whether the right pollen is carried to the right place. From Darwin's evidence we know their value among orchids, but orchids we may regard as somewhat exceptional, on account of the peculiar structure of their pollen masses.

My own experience, I must confess, is of a mixed character. Early in the summer I kept my eyes on "a busy bee" of the "Bumble" kind, in a deep lane in Wiltshire, and I saw beyond question that it kept itself entirely to *Lamium album*, constantly passing by divers tempting flowers of other kinds of plants. My next venture was also with a bumble: this time a French one. It was on a sunny gravelly bank, where there was an abundance of plant life; but my protégé was tempted only by *Teucrium Scorodonia*, of which there were numerous specimens to be seen. A third time I kept a bee in view for as long a period as I could: it was a hive bee, and again I found that it stuck to one species of plant, —one of the common brambles.

I began to think that the "one plant" theory was in a fair way of being proved, when, alas! a few days afterwards, I came across a bevy of hive bees who upset all my speculations by flitting carelessly over a piece of ground, clothed with three or four kinds of flowers, and extracting the pollen from each, utterly regardless of the "fitness of things."

Now this matter is one so entirely of observation, and yet so interesting in its results, that I think many of the country readers of Science-Gossip, who are blessed with a good pair of eyes, a tolerable stock of patience, and a regard for accuracy, will be glad to lend a hand in solving it.

Havre. W. W. Spicer.

INFLUENCE OF FOOD AND LIGHT ON LEPIDOPTERA.

I PROCURED about 2,500 larvæ of the Tiger Moth, in a young state. I divided them into six lots, keeping each in a separate cage, and feeding them differently. One lot was fed on willow, another on butter-bur (*Petasites vulgaris*), another on hawthorn, another on plum, one on dock, and one on nettle, grass, bramble, and various other kinds of food. A considerable proportion of each became perfect insects, and I could detect no difference whatever in the colours, from the food they had lived upon. That is to say, the variations in colour and marking, were not to be traced in any case to the food. I kept several batches of eggs, and reared the larvæ carefully through the winter, and then again divided them, giving each lot a different kind of food. Again the same result. I found that one year the larvæ I had brought from the coast had usually the inferior wings more or less of a yellow shade, instead of the bright scarlet of the Cheshire specimens.

Having for many years continued these experiments without obtaining any marked results, I this year tried another of a different nature. I selected the tortoiseshell butterfly, as one of the least variable species we have, and I procured several broods of young larvæ just emerged from the egg. These I kept in a dark box until I had all ready, and then I divided each brood into three lots, putting one-third into a box in my photographic room which is lighted with orange-coloured glass, one-third into a box lighted with blue glass, and the ventilators carefully shaded so that only light of a blue colour could reach the larvæ, the remainder were put into an ordinary cage, in the natural light.

The latter fed up and came out into butterflies in the usual time. Those in the blue light were not healthy, and though every care was taken, at least fifty or sixty died before changing, and a considerable number changed into chrysalides, and then died; those that came out into perfect insects were very much smaller than usual. Those lighted by orange-coloured glass fed up very well, but many of the two first lots had come out before one of them changed into chrysalis; scarcely one of them died, and I examined each one before I allowed it to fly, to see what effect had been produced.

Those reared in the blue light differ from the ordinary form in being on an average much smaller; the orange-brown is lighter in shade, and the yellow and orange run into each other, instead of being distinct and separate.

Those reared in the non-actinic, or yellow light, are also smaller, the orange-brown is replaced by a salmon colour, the venation more strongly marked, and the blue dashes at the edge of the wings in the usual form are in these of a dull slaty colour.

One evening I found about six hundred butterflies out of chrysalis, of those in the photographic room, and taking each one carefully I examined them all and allowed them to fly; shortly afterwards I found the whole of them had settled against the wall of the house, and presented a most remarkable appearance: they remained there more than half an hour. The western sun was shining against the wall, and it is not unlikely that when suddenly brought from the red light, where they had spent all their lives, to the bright daylight, they were so dazzled as to act in this peculiar manner.

The results of this experiment do not show any very startling change in colour, such as one would have expected from the known effects of light on plants, and from the occasional occurrence of very much more strange varieties one now and then meets with, which cannot have been subject to such severe treatment; still, when we consider that even this difference is caused in one generation, and in the course of a month, it is a very suggestive fact, and leads one to think that light has certainly as much or more effect on the colours of Lepidoptera, than the difference of food, and might in a long series of generations lead to very material changes in both form and colour, and perhaps considerably modify our ideas of what constitutes a species.

J. Sidebotham.

Remarkable Flight of Moths and Butterflies.—A lady who lives near Conway wrote to me a few weeks ago in the following words: "On Saturday, the 2nd of October, we noticed a great rise in the barometer, and the air out of doors was warmer than in the house, and at one o'clock, all my family turned out to see 'the wonderful sight,' viz., a *flock* of Humming-bird Hawkmoths, and a great many butterflies of the *Vanessa urticæ*, and still more of *Vanessa atalanta*. On one plant of mesembryanthemum I counted four of *Atalanta* and two *Urticæ*, and from one place as I stood still I counted forty of the moths. Is this the usual time for these animals to flourish? And is it uncommon to see them in such great numbers?" I am no entomologist, so I could only tell my correspondent that all the three kinds are seen in autumn, and that I believed the Humming-bird Moth to be an insect sufficiently rare to render such a sight as she described very remarkable. Can any reader of Science-Gossip give any further information, and say whether large flocks of these insects made their appearance elsewhere? From the sudden rise in the temperature, I should suppose that the wind brought them from some warmer place where they are more plentiful.—*Robert Holland, Mobberley, Cheshire.*

PALE YELLOW BUTTERFLY.

IT will doubtless interest your readers to learn that *Colias europome* has appeared at or near Horsham. I have been fortunate enough to secure one of (I think) five specimens which were taken last year there, by an individual who set no store by them, probably taking them for pale *Edusæ*. There they have lain hidden, badly set, till chance took an entomologist (Swaysland, of Brighton) that way, who lost no time in securing three of them. There is not a shadow of doubt as to their being genuine Horsham captures, as upon reference to Mr. Swaysland, may be fully ascertained. I subjoin a description of this charming insect, my specimen being a male. Expanse of wings, 1¾ inches. Ground colour of all the wings a peculiar *light greenish yellow*. Fore wings with an almost diamond-shaped black discoidal spot. The dark border neither so wide nor so much toothed in the inside as in *Edusa, nor of so rich a black*, and it has but three lines (ground colour of wings) upon its breadth near the apex of wings, which do not reach the hind margin. Hind wings with a double orange discoidal spot smaller than in "Edusa," and with the dark border not so wide, toothing more regular and approaching scallop shape. Beneath, the discoidal spot on fore wings is smaller than in *Edusa*, and with a distinct pale yellow dot in its centre. That on the hind wings very similar to *Edusa*, but smaller. Fringe on under side tinged rosy. Antennæ somewhat shorter and slenderer than in *Edusa*, and the club not quite so long.—*W. Hambrough, Worthing.*

[Is our correspondent certain that his insect is not a variety of *Colias hyale?*—Ed. S.G.]

TURKISH LONG-TAILED TITMOUSE.

(*Accordula tephronota*, Günther.)

THIS species is generally distributed in Turkey in Asia Minor and Europe, and is more numerous than the Long-tailed Titmouse in Western Europe (*Parus caudatus*). It is principally found in the interior of forests in the spring and summer, and when feeding on the lofty oaks, and hanging beneath the expanded branches of the tree, searching for insect food with its long magpie-formed tail, it has more the resemblance of a grasshopper than a bird. They congregate in families in the autumn, and continue congregated in the winter, when they scatter far and wide, and stroll over large areas in search of insect food. In the winter, they are partial to feeding amongst alders in damp situations, with others of the titmouse family; they are also found feeding in small groups with gold-crested and fire-crested wrens. They have a stronger cry than the south-western bird, but their habits are similar. Their nests are sometimes found on bushes, but principally amidst ivy on trunks of trees and on the branches of cypress-trees. The nest is built of similar materials to that of the *Parus caudatus*, but wants the fine oval symmetry and finish and dome-like form of the latter. The nest lies on branches slantingly to the sun, so that the bird goes in at the end instead of the side, as the south-western bird does. Their eggs are eight in number, small, and of a light brick-brown, spotted, at the broad end. Many of these birds build early in March. It has hitherto been found only in Turkey and is a constant resident in the country.—*The Levant Times.*

THE RUFF AND REEVE.

(*Machetes pugnax.*)

WHAT a host of rare birds are conjured up in the mind of the ornithologist at the bare mention of the fens!—the great fens of Lincoln, Cambridge, and Norfolk, which once covered such an immense tract of country, and which were seldom invaded by any one except the inveterate sportsman, whom neither bog nor water could deter, or the crafty fowler, whose life depended upon his trade.

Here the long-winged, long-tailed Harriers quartered the ground uninterruptedly for miles, pouncing upon the young Teal or Shoveler, or carrying off, from the very surface of the water, the unwary Spotted Crake before it could dive. Here the Short-eared Owl reared its young, and brought them fat Water-shrews and Short-tailed Field-mice. Here the Bittern "boomed" as it crept amongst the sedge, and wove and shaped the pliant flags to receive its olive-brown eggs. Redshanks flew in clouds, and filled the air with their noisy cries, while the loud whistle of the Godwit often told the fowler where the long-legged, black-tailed bird had formed its nest. On the "meres," the beautiful Crested Grebe displayed its coloured frill and white satiny breast, while its smaller relative, the Dabchick, like a little brown ball, ducked, and dived, and reappeared in the uninterrupted enjoyment of its retirement. The wary Water-rail threaded its way through the grass, and reeds, and sedge, or rose with slowly flapping wing, and pitched among the yellow water-lilies, to pick the little beetles off the petals.

The ear heard, although the eye could not always see, the skulking Grasshopper Warbler, as it crept amongst the reed stems with its curious reeling note; and a patient search was necessary to find its well-concealed and pretty nest at the foot of some waving tussock. Occasionally, the nest of the rarer Savi's Warbler was discovered: a beautiful cup-shaped structure, made entirely of the interwoven leaves of the reed, and containing beautiful pinky-looking eggs. More conspicuously, the Bearded Titmouse showed himself as he flitted from stem to stem, or crossed the water with an

undulating jerky flight, uttering as he went his ringing tinkling notes.

We have heard an old sportsman say that, more than forty years ago, when searching these fens for the large Copper Butterfly (*Polyommatus dispar*) and other rare insects, he frequently saw the nests and eggs of all these birds; and the children of the fen-men used to bring him in hatfuls of eggs of the Harriers, Short-eared Owl, Great Crested Grebe, Black-tailed Godwit, and Spotted Crake. Fancy, buying a hatful of Spotted Crake's eggs for sixpence, or half a dozen fresh Bittern's eggs for a shilling! What rare days for the ornithologist! But they are passed away! The great fens are drained, and have almost ceased to deserve the name. The beautiful birds which once haunted them, finding no longer the same retirement and opportunities for nesting, have disappeared. Some, as *residents*, are now extinct, and we see them only at particular seasons of the year, when, as if to try another chance of nesting here, they revisit the old country, and — are shot and chronicled as rare!

We might allude to the Spoonbill and Avocet, which formerly bred in our fens, and to one or two other species which are now only occasional visitants where once they were plentiful.* But we will confine our attention for the present to one bird in particular, which may be now almost placed in the same catalogue—the Ruff, and his mate, the Reeve.

A most singular bird this is. Belonging to the same great group which comprises the Snipes and Sandpipers (*Scolopax*, *Tringa*, and *Totanus*), it differs remarkably from them all in many respects. Old naturalists placed it among the *Tringæ*, but as the species became better known, it was found that, unlike any other wading bird, the males were polygamous, and fought for possession of the females; differed from each other in colour; were a third larger than their mates; and during the breeding season put forth a curious frill of feathers on the neck, which disappeared in autumn when the sexes separated. These facts led naturalists to consider the bird *generically* distinct from those above named, and it is now generally placed in the genus *Machetes*, which Cuvier, in 1817, proposed for it.

By far the most complete account which has been given of the Ruff and Reeve is that which was published by Montagu, in 1813, in the supplement to his "Ornithological Dictionary." This distinguished naturalist travelled from Devonshire into Lincolnshire—a long journey in those days—with the sole object of studying these birds in their native fens, and of ascertaining more than was then known of their habits and curious change of plumage. He experienced the greatest difficulty in discovering the haunts of these birds, for the fen-men, who made a trade of snaring them for the table, refused to give him any information on the subject, fearing lest their trade might be interfered with. He attained his object, nevertheless, and carried back with him several live Ruffs to Devonshire. These he kept in confinement for a few years, and carefully noted all the changes of plumage which they underwent, and the peculiarities of habit which they displayed. His interesting remarks on the subject should be read *in extenso* by every naturalist.

The male birds, as the name *Machetes* implies, are extremely pugnacious, and this is especially the case at the commencement of the breeding season when the birds are pairing. Two Ruffs will then contend for the possession of a Reeve, and with heads lowered, frill distended, and wings trailing the ground, they rush at one another again and again, like game-cocks, leaping and striking with the bill, until one or other is forced to yield. Having paired and selected a spot for the nest, they build not unlike a Snipe, and in much the same situations, generally choosing the middle of a tussock or clump of sedge. Here they lay four eggs of an oil-green colour, blotched chiefly at the larger end, with liver brown. In size and shape the eggs are equal to those of the Redshank, but may be distinguished as follows: the Redshank's egg looks as if it were painted in water-colour, has a lighter ground-colour, and smaller markings on it. The Reeve's egg has a more oily look and feel, the texture is smoother, the ground-colour generally greener, and the blotches thereon larger.

It is a remarkable thing that we seldom see two Ruffs of the same colour; the variety is surprising. As a rule, the male bird renews the same coloured frill in each succeeding year. This has been proved repeatedly by marking birds in confinement and noting their changes of plumage; but it has occasionally happened that a Ruff which had a light frill one year, assumed one of a darker shade the succeeding spring. The frill begins to make its appearance in April, and before the end of July it has almost disappeared. This bird appears to have a wide geographical range. We have specimens in our collection from Southern Russia, Nubia, and the Cape of Good Hope. Great numbers are imported every spring from Holland, and may be seen in most of the poulterers' stalls, especially in Leadenhall market. They are considered great delicacies for the table, and generally fetch from fifteen to eighteen pence a piece.

At that season of the year the Ruff and Reeve are now seldom met with in England, for, as we have observed, their breeding haunts have been almost destroyed. Mr. Stevenson says that in East

* Sir Thomas Browne, writing two centuries ago, remarked that the Spoonbill then nested in Norfolk and Suffolk (see his *Works*, Wilkin's Ed., iv., p. 315). The last eggs of the Avocet which are recorded to have been taken in England, were obtained five-and-twenty years ago at the mouth of the Humber.

Norfolk a few pairs still breed annually, and are strictly preserved. In Suffolk, Cambridgeshire, and Yorkshire, where this species was once plentiful, it has now ceased to breed, and in the more northern counties of Durham and Northumberland a nest is very rarely found. We have lately been informed that a few pairs have been found nesting in Lincolnshire within the last two years.

During the months of August and September, at which season great numbers of shore-birds migrate southwards, the Ruff and Reeve are more commonly met with.

Those who have had much experience in shore-shooting or marsh-shooting, may smile at the confusion which was thus created, but it must be remembered that at the time when Ruffs and Reeves were first described by English authors, none of the advantages which we now enjoy in travelling, corresponding, and collecting, then existed. Birds then were not so easily procured as now, and very few knew how to skin and preserve a specimen when they had it. When we consider this, and reflect upon the difficulties with which the practical naturalist had formerly to contend, we can scarcely speak too highly of the works of such men as Colonel Montagu.



Fig. 249. The Ruff and Reeve (*Machetes pugnax*).

We have found them at this time of year in the tidal harbours on the east and south coasts, and have several times shot them when looking for snipe in marshy ground near the sea. More rarely we have seen them on the Brent, within a few miles of London. The males had then lost their frills, and were only to be distinguished from the females by their larger size and darker plumage. The colour of the legs varies almost as much as the colour of the frills. Orange, lemon, clay colour, lead colour, and black may be found, with all the intervening shades, and this difference of colour in the legs as well as in the plumage led some of the older naturalists to create much confusion by describing different individuals as distinct species.

But to return to the Ruff. The practice of netting this bird for the table in the spring of the year, after the pairing has commenced, is most reprehensible. To destroy the breeding-grounds, and kill the old birds is a sure way to make a species extinct, and yet this is what is being done in the case of the Ruff and Reeve. We would earnestly beg of those who may meet with these birds in suitable localities for nesting, in the spring of the year, to leave them unmolested, and not to cause another name to be added to the list of beautiful birds which have already become extinct as residents in this country.

J. E. Harting.

ZOOLOGY.

De gustibus non est disputandum.—"Dear Miss," said a lively old lady to a friend of mine who had the misfortune to be confined to her bed by a broken limb, and was complaining that the fleas tormented her; "Don't you like *fleas?* Well, I think they are the prettiest little merry things in the world; I never saw a dull flea in all my life!"—*Kirby's Introd.*

The Australian Bee.—Can any reader conversant with Australia show any "just cause or impediment" why the native bee of that island-continent should not be introduced into Great Britain? If too tender to propagate itself in a wild state here, it seems admirably adapted for preservation in hives. It lives in societies; it makes good honey; it is much smaller than our bee; it builds in trees, and is therefore well suited for wooden hives, or at any rate for the Swiss form of hive; above all it is perfectly harmless, not being provided with a sting. This last fact alone would cause it to become a great favourite, were it but once brought over. It must, I imagine, be very prolific, as it is pertinaciously sought after by the natives for the sake of the honey, and, were it not a good breeder, it must have yielded to ages of persecution, like the moa of the same hemisphere. As to the means of transport, I presume that either the ova or the grubs in an early stage might be transmitted in ice, easily enough. However, there may be objections to its introduction of which I am ignorant, but on which some Australian may, if he will, throw light.—*W. W. Spicer, Havre.*

Badgers.—There was a recent inquiry for notices of Badgers in England. Some have established themselves during several years in a woody glen extending from this house to the sea. One day the children ran to announce that they had seen a strange animal lying in the shrubbery by the side of a large retriever. Both dog and Badger were either blown in the chase, or mutually indisposed for a contest, or the latter (evidently a young one) was feigning death until he scampered off on the nearer approach of the young naturalists; or he might have been playing with the dog, as young Badgers are said to do. The cartloads of rubbish thrown out by the Badgers on the hill-side, show that their holes are large and doubtless commodious, and have more than one entrance or exit. One was seen last year in the garden-walk near the house. But he does not restrict himself to the walks, for he has helped himself to green peas this summer, and revelled in ripe strawberries, dexterously turning back the nets that covered them. I cannot say if this inconvenient taste preceded, or was the result of his evidently free indulgence in wild strawberries. Apples and figs that have fallen in the orchard vary his dessert, whilst he finds more substantial vegetable diet in the turnip and wheat fields. But he is not without his uses, having destroyed many wasps' nests, doubtless for the sake of the grubs. My friend Mr. Hammond told me that a few years ago there was a sudden immigration of many Badgers to a wood near his residence in Kent, and that one of them was white. I have always protected the Hedgehogs, which were once numerous here; some found their way into the kitchen, and would take milk and bread in a saucer. I think that the Badgers have scared them, as well as Foxes. One of these cunning thieves boldly attempted (a few years ago) to seize, in my sight, a hen at 8 a.m., within two feet of the dining-room window. Once, on an unusually cold winter's night, I was awakened by the breaking of glass in a window which opened on the terrace. Reynard had left footmarks on the snow, and some of his fur on the broken pane. His keen scent had doubtless discovered that there had been woodcock on the supper-table the evening before his attempted burglary. He also climbed up a spruce fir, and thus getting over the yard wall, 8 or 9 feet in height, tried in vain to get at poultry in a hen-coop.—*C. Fox, Trehale, near Falmouth.*

Great Titmouse (*Parus major*, Linn.).—This species is generally distributed in Turkey in Asia Minor and Europe, and is pretty numerous. A lively active bird, it frequents gardens very much, seeking its insect food amongst trees, bushes, and nooks of old wood, &c. It is often found in cities and villages, amidst populations, where it builds its nest in holes of walls, holes of trees, &c.; it is also found in old woods, which it prefers to low brushwood; it is rarely seen on bare mountain sides, except where a few old isolated decayed trees remain, whose trunks and branches afford food and shelter to these restless little creatures. They congregate in the winter in parties, and travel over wide districts daily in search of insect food. This species is a constant resident in Turkey.—*The Levant Times.*

Blue Titmouse (*Parus cæruleus*, Linn.).—This species is generally distributed in Turkey in Asia Minor and Europe, and is more numerous than *Parus major*. It is also found in cities and villages, where it builds its nest in holes of walls, old trees, &c., and is often seen in gardens actively engaged in searching the trunks and branches of trees for its insect food. It is most numerous in woods, where the alder, hazel, and oak abound. It is seldom seen in bare mountain districts, except where a moderate proportion of wood exists. They congregate in winter and travel over wide areas in search of insect food, and are constant residents in Turkey.—*The Levant Times.*

Death's-head Hawk-moth (*Acherontia atropos*).—In the last number of Science-Gossip your correspondent "T. P. Barkas" records the abundancy of the caterpillar of *A. atropos* this season. Perhaps it may interest him, as well as others of your correspondents, to know that it has also occurred in unusual plenty at several places in Norfolk. I have now four of the pupæ of this moth undergoing their last transformation, one of which was brought to me in the larval state, the other three in the pupal state. Several other of my entomological friends also possess pupæ, one of whom has now no less than thirty, all taken from one potato-field.—*Robert Laddiman, Norwich.*

Short-eared Owl (*Strix brachyotus*) Nesting in Norfolk.—From a correspondence with Mr. Stevenson, as to the position of the nest alluded to in the last number of Science-Gossip, I am inclined to think the young Owls in Winterton Decoy were of the long-eared species, the nest having been placed in a tree, whereas the Short-eared Owl almost invariably nests on the ground.—*J. G. N., Aldborough Rectory.*

Tortoises in Winter.—I should be glad to know from any one who has kept them whether freshwater tortoises will stand the winter in the open air without protection. Mine are in a garden tank or pond, which contains four or five hogsheads of water, standing about two feet deep, and they mostly spend their time on a ledge or shelf, which is just covered by the water, and which supports a few stones and shells, on which they can climb if so disposed. One which was sold as a "Mediterranean Tortoise" is about six inches long and closely streaked; the other three were called "North American," and are smaller, and spotted with yellow. I should be glad to learn their scientific names.—*George Guyon.*

Snow-bunting.—A correspondent of a Cornish weekly paper I have had sent me, writing from Camborne, says he has, within the last fortnight, seen on a common near that town several of the Snow-buntings flying with the Larks. He shot one, which was a beautiful specimen of this rare bird so far west.—*H. Budge.*

Red Admiral.—In reply to Mr. S. J. B. Moseley's query this month under the above heading, I may state that all the *Vanessæ* have a great partiality for sweets, more indeed than other Diurni. Sugaring trees or blossoms in the daytime has been proposed as a means of capturing the rare *V. antiopa;* but I am not aware whether this plan has ever been carried into effect. About three weeks ago, while staying at Hastings, I had occasion to pass through a plantation where I had been sugaring the previous evening. There I noticed three or four specimens of *Vanessa atalanta* settled, imbibing the remains of the treacle and sugar; they were, however, very much on the alert and flew away directly I approached, only, however, to return again after the lapse of a few seconds to continue their repast. This butterfly often visits ivy-bloom, so resorted to at dusk by autumnal Noctuæ. I may take this opportunity to mention that although as a rule this has been one of the worst seasons known for Lepidoptera, I nevertheless captured many *Agrotis saucia* (the Pearly Underwing) in the plantation I have just alluded to.—*J. C. Melville,* Nov. 3.

Bees Deserting.—I have for more than thirty years been a bee-keeper, but have never lost a swarm from the above cause until this year. Early in June I purchased a capital swarm, and put it into Pettitt's "Hive of Hives," with a comb well filled with honey, and several pieces of guide-comb on some of the other bar-frames. They worked well for two or three days, and made some good additions to the guide-combs, when they left the hive, taking away all the honey, and went I know not where. I have had as many as twenty cases of desertion reported to me this season. One swarm I sent to London one Thursday morning, whence they were taken to Blackheath, and were given their liberty on being placed in the garden there, where they commenced working immediately, and they worked well all Friday, Saturday, and Sunday, until about noon when they took it into their heads to "fly away," and were never heard of afterwards. This swarm was in one of Pettitt's "Temple Bee Hives." Therefore your correspondent, Mr. Wm. Balchin, may rest satisfied that he is not alone in this "flyaway season"; and perhaps he was not so fortunate as I was after all, for about ten days after I lost my bees I was out walking, and in a bush by the side of the footpath I saw something looking rather black as I passed, and on stepping back I found it to be a swarm of bees. Having a large silk handkerchief in my pocket, I took it and fitted it nicely over all the bees, and after giving the bush a smart shake, I brought away my prize—took them home and put them into a hive without losing a single bee, and they are at the present time in my apiary likely to stand the winter. Now, as to the *cause* of swarms deserting their hives, I believe it to be this—viz., that the queen is a *young queen,* unfertile, very flirty, and was running about the hive like a wild bee all the while she was in it; and it would be interesting not only to me but to many readers of your excellent journal if Mr. Wm. Balchin would kindly state whether he found, in *any of the combs* which the bees deserted, any signs of fertilization. I have been much interested in the article of "D. D. B.'s" in your last number on Ligurian Bees.—*W. J. Pettitt, Italian Apiary, Dover.*

Little Auk.—The readers of your journal may be interested to know that a Little Auk (*Alca alle*) was captured alive at Harwich, and is now in my possession. Can any of your readers inform me what is the most suitable food for it? It is very healthy and tame.—*James Mash, jun., Butter Market, Ipswich.*

Leucania vitellina.—In Mr. Wonfor's note, in Science-Gossip for November, of the capture of this rare moth, it is stated, on the authority of Mr. Newman's "British Moths" (1869), that only two specimens of it have been taken in England. This statement is correct, as far as that work goes; for I find, on reference, that its author says, "two specimens of this delicate insect have been taken in England, both of them at Brighton, by Mr. Thorncroft." But the following three *recorded* captures appear to have escaped Mr. Newman's observations, viz., the original one, on which the species was introduced as British, by Mr. H. Cooke, at Brighton, in August, 1856 (recorded in the *Substitute* and in the *Entomologist's Annual* for 1857, p. 99); another by Mr. F. Bond, in the Isle of Wight, exhibited at the October meeting of the Entomological Society of London, 1860 (recorded in the *Zoologist*, p. 7269, and in the *Entomologist's Annual* for 1861, p. 98); and a third by Mr. Rogers, at Freshwater, on the 21st October, 1862 (recorded in *Zoologist*, p. 8296, and *Entomologist's Annual* for 1863, p. 150). These omissions appear the more extraordinary as the author of "British Moths" was the editor and publisher of both the *Substitute* and *Zoologist*, and is a member of the society above mentioned. Apart from them, it may be observed that it is always safer to use the expression "recorded" than "taken;" for instance, specimens of *Leucania vitellina* have been *taken* at Brighton, besides any of those above recorded; and several have been taken at Deal, by Mr. Syme, and the late P. Bouchard. Specimens from Deal were referred to in *Young England*, in a paper on the *Leucanidæ*, July, 1864, reviewed by Mr. Newman in his *Entomologist*, September, 1864. In Mr. Wonfor's note, the recently captured specimen is stated to have been taken "at Sugur," as if it were the name of a locality; it should, of course, be "at sugar," a well-known method of collecting by bait. This mistake appears also in a corresponding record in *Scientific Opinion*. The note in question also affords an instance of the confusion likely to arise from the use of *English* names, as the moth is therein termed "The Brighton Delicate," whereas in "British Moths" it is called "Delicate" only. Of course, no scientific person could recognize either appellation. Mr. Wonfor's reference to the price (7s. 6d.) at which this specimen was sold, under the impression that it was only *Leucania pallens*, is naturally intended to stigmatize the vendor, who asked so much for an insect which, as he must have known, is not worth twopence; but it seems hardly necessary to have drawn attention to this, as he was fairly punished by the insect in question turning out more valuable than he supposed. —*E. C. Rye*, 10, *Lower Park Fields, Putney, S.W.*

Spotted Woodpecker.—As we do not often find a Woodpecker in captivity, perhaps it might be interesting to some of the readers of Science-Gossip to say a few words about the Greater Spotted Woodpecker (*Picus major*). He certainly is a very interesting bird, much more than one might think. We mostly hear of him in the woods, hunting for food, where he is often heard, but seldom seen. Brought up from the nest he is tame, and a very interesting fellow he is. I bought one of a cottager, who had him for about two months, and brought him up exceedingly strong in a small box with a few wires in front. He is now about five months old, and as merry as a cricket. All day long he is at work, tap, tap, tap; indeed, he will soon have a hole through the top of his cage, which, by the bye, is half an inch thick. He has rather a capacious appetite; he sometimes will eat in a day twelve Spanish nuts, besides bread and hempseed, and pieces from the table, most of which he will take from the hand. For some few weeks I had him in an aviary, but, finding him rather pugnacious, I was compelled reluctantly to remove him, so I had a large cage made for him; but the aviary is the best place, and mine is large, about six feet square. There he would take his bath almost daily, and climb the tree, carrying sometimes a piece of wood or an apple with him: after playing some little time, he would drop it and carry it up again. At times he would hide his food in the cleft of the tree, sometimes hiding himself behind a stump, just peeping to see where you might be; at other times performing most amusing antics, quite as lithe and changeable as the Blue Tit. When very pleased or if anyway alarmed, he utters a loud sharp noise, pak! pack! and at the same time raises the feathers on top of his head. His favourite way of sleeping is by hanging to the front of his cage with his head thrown back, supporting himself partly with his tail. Although the time for moulting is almost past, my Woodpecker has not yet commenced.—*C. J. W. Rudd.*

Late-Feathered Family.—A thrush's nest has been discovered in a thicket in Keil's Den, Largo, Fifeshire, containing four young ones not fully fledged. Such a discovery in October is rather remarkable.—*A. M. F., East Neuk o' Fife.*

Double-brooded.—This season I had *O. Pudibunda* come out rather early; laid eggs, larva hatched, and eventually became pupa, and these have now become imago again. Is this not somewhat remarkable? I have bred the same moth seasons before, but never knew this to occur.—*John Purdue.*

BOTANY.

Veronica buxbaumii.—Permit me to add two more stations for the above plant; viz., at Colchester, where it occurs very frequently in the fields, and more particularly by the roadsides; and also on Barnes Common, and in the surrounding fields.—*G. T. N.*

Tree Oxalis.—In the greenhouse of a banker of this town there is now to be seen a remarkable vegetable phenomenon. It consists of a plant of *Oxalis*, of the pretty pink variety so well known to gardeners. But the peculiarity of the specimen is that the leaves and flowers are elevated on a compact woody stem, rising nearly a foot from the pot in which it grows, and (as far as I can guess) averaging about six inches in circumference: the whole presenting an appearance somewhat similar to that of a South American tree-fern. The plant has been in the same pot for about six years, and the stem is gradually increasing in bulk. Such an instance of accretion is quite without parallel in my experience; and, as your readers are not likely to have an opportunity of seeing the plant referred to, I think it desirable to make known the existence of such a phenomenon through the medium of Science-Gossip.—*Charles F. Thornwill, Warwick.*

Curious Variety of Plantago coronopus (L.).—I inclose a drawing of a very curious and, so far as I can judge from my own observations, permanent variety or monstrosity of the common Buck's Horn Plantain. It was gathered in May, 1868, near Wallasey, in Cheshire, growing in very sandy soil, along the roadside; and again this summer (1869) it appeared in plenty at the same place. Every plant for ten yards or so presented this curious appearance. The bracts are wonderfully enlarged, what would be the lower ones being the largest, the upper the smallest; thus presenting the appearance of a green composite flower. In a word, they have become regular leaves, with acuminate pinnatifid lobes; the flowers are somewhat fewer, and far between, and larger than in normal specimens. It is but fair to state that one spike in, on the average, every twenty, though very much enlarged and coarse in its manner of growth, has not its bracts quite so prominent, thereby proving it to be more a permanent monstrosity than a variety. If it be entered as either of these, the name *P. coronopus*, var. *patinæformis*, will aptly express the general flattened appearance of the flower spike.—*James Cosmo Melvill, B.A.*

Holly.—Your printer has made me appear to fall into Mrs. Watney's error of spelling the Welsh word "Helig" with two l's, in my note last month respecting the derivation of "holly;" whereas I only spelled it with one, except the first time I used the word when quoting Mrs. Watney. A Welsh correspondent, to whom I have since written upon the subject, suggested—what I did not think of—that the peculiar sound which double *l* has in the Welsh language, would at once remove any likeness of sound between "holly" and "hellig," as Mrs. Watney spells it.—*Robert Holland.*

Brambles in Hedges.—Good farmers, now, take every possible pains to keep their hedges clean; and they weed up the brambles, which not only look untidy, but cause some injury by choking the hawthorn plants; but our forefathers appear to have not only tolerated blackberries in their hedges, but even to have sown them to improve the fence. Tusser, who lived in the sixteenth century, says:—

> "Go plough up, or delve up, advised with skill,
> The breadth of a ridge, and in length as ye will;
> When speedy quickset, for a fence ye will draw,
> To sow in the seed of the bramble and haw."

It is no wonder, then, that we find blackberries so troublesome in old hedges at the present day. Many of our hedges have been in existence from Tusser's time, and before, and there is little doubt that the blackberries in them can boast as old an ancestry as the thorns themselves. Nettles are, if anything, more difficult to eradicate than blackberries. Tusser gives a receipt for killing them; he says:—

> "When plots full of nettles be noisome to eye,
> Sow thereupon hemp-seed, and nettles will die."

—*Robert Holland.*

Orange-spotted Potentilla.—Among the many discoveries of rare wild flowers made some years ago by Mr. G. Don in various parts of Scotland, not one perhaps has received less confirmation than that of *Potentilla opaca*, or, as it is sometimes called, *intermedia*, said to have been found on the Clova mountains. This plant has not been met with by any botanist since Don's time. *Potentilla opaca* is described by some as being distinguished in one respect from its nearest relative, *P. alpestris*, by having a bright orange spot at the base of its petals, whereas the flower of *alpestris* is said to be entirely yellow. Now on one of those stupendous rocks at the head of Loch na Gat on the north side of Ben Lawers, there is found a variety of *alpestris*, having an orange spot exactly similar to that of *opaca*. It would seem, then, that this orange spot should never have been made a distinguishing mark of *opaca*, or at least that the Ben Lawers plant is a link between the two species, and therefore another nut to crack for the splitters. But what I wish to observe is, how strange it is that no notice has been taken of this Ben Lawers variety by our botanical books in general; and especially that there is no mention of it whatever in that large one now being published, and which is said by a great authority to be exhaustive of the subject on which it is written. Babington, I believe (but only in the last edition of his Handbook), does mention this variety under the name of *maculata*: I am not aware that it has been noticed by any other.—*R. W.*

MICROSCOPY.

Cells.—The new cell is a very old acquaintance of mine, and a very untrustworthy one. I would strongly advise your readers never to use india-rubber bands, as they always shrink away from the glass even if coated with Brunswick black. Brunswick black and gold size, both become porous with age, thereby allowing liquid preparations to leak, and both "sweat," *i.e.*, condense in oily drops on the covering glass of dry preparations. I have tried a great many kinds of cells, and I think *flat* brass rings the best. As a cement, Bell's is probably the best; it seems always to retain a small amount of elasticity, and does not "jar" off the slide. It has, however, one drawback, viz., that succeeding coats re-dissolve the first, but with a wire clip, this is of little importance.—*C. P. Smith.*

Prickly Pear.—I have found an interesting object in the Prickly Pear, or Indian Fig, now in season in our markets. The spines, although very minute, are easily extracted from the free end of the fruit by means of the forceps, and, when viewed by reflected light, present a beautiful and remarkable appearance. The observer will see the cause of the extraordinary sensation in the lips succeeding an incautious bite of the so-called pear. Its pulp contains a multitude of beautiful raphides, which, however, do not appear to be affected by polarized light, and the stomata and curious star-like bodies of the cuticle also make a very effective slide.—*G. W.*

India-rubber Cells.—As Mr. Wonfor so completely denounces the use of the *India-rubber cells*, I trust I may be allowed to make a few remarks on his statement in regard to them. In justice to myself I may state that had I not been thoroughly convinced of the efficiency of the cell described, I should not have ventured to have asked for space in your valuable columns to describe a cell which, according to your correspondent, would turn out so completely useless. That it *is* one of the *cheapest* and most *efficient* cells, I am still firmly convinced, notwithstanding the remarks of your correspondent, and I base my belief on the following grounds. I have a large number of cells bearing on their labels the dates 1864, '65, '66; these are in as good condition as when I first constructed them, and are likely to remain so, for what with travelling, &c., they have met with as rough usage as the majority of slides could experience. Selecting a few of the less valuable ones, I experimented on them, allowing them to fall from a good height on to a table on the *flat* of the glass, and striking them sharply on the *edge*,—in fact, submitting them to forces which the most careless microscopist could guard his collection from; and what was the result? Not the slightest flaw in the union of the cell components was detected, and I have a higher opinion of their durability than ever I had before. My friend who first showed me this method has had a far older experience than myself, and he still prefers it to any other cell. Besides, I must remind Mr. Wonfor that every *careful* microscopist keeps his slides bracketed or otherwise disposed so that the jars they are subject to are *very* insignificant. The force I used in experimenting was far too violent for a *fair* test.—*W. B. Lewis.*

Fish Scales.—The illustration now given in continuation of the series of fish scales is that of

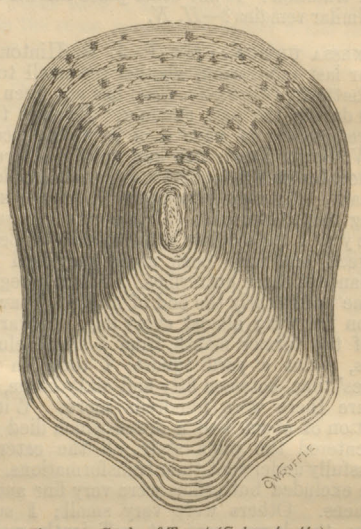


Fig. 250. Scale of Trout (*Salmo trutta*).

the Common Trout (*Salmo trutta*), from specimens identified and kindly furnished by Henry Lee, Esq., F.L.S.

Leamington Microscopical Society.—We are glad to learn of the establishment of a Microscopical Society at Leamington, and wish it success.

Microscopical Manipulation.—The publication of Mr. Suffolk's Lectures was commenced in the *Chemical News*, in No. 513, September 24, and continued weekly. We also observe that they are being reproduced in the *English Mechanic*.

Melicerta in Families.—It may be new to most, and interesting to all, microscopists, to know that these beautiful rotifera are sometimes seen grouped together. I have now in my tank a family of four attached in a dendritic manner. *Two* in this polype form are very numerous in my aquarium. —*G. H. F.*, 13, *West Abbey Road, N.W.*

Vulcanite Cells are recommended by some of our correspondents, but their communications arrived too late for insertion.

NOTES AND QUERIES.

St. Mary Redcliff, Bristol.—Doubtless many of your readers have visited the church of St. Mary Redcliff, Bristol, and seen a singular bone, apparently a rib, which rests on the capital of a pillar at the west end of the north aisle. Some perhaps may have also heard the tradition which is somewhat current, that it is the rib of a "dun cow which at one time supplied the whole of Bristol with milk." Rumour also adds there are several other ribs of the same animal preserved in various parts of England. Can any one give any satisfactory account of this relic—when and why it was placed in the church,—and state what truth there is in the vulgar tradition? Is any other place known to contain similar remains?—*H. N.*

Vanessa urticæ.—Mr. F. J. D. Hinton asks, in your last impression, whether the small tortoise-shell butterfly (*Vanessa urticæ*) has not been rather scarce during the past summer. He says that he only remembers to have seen it on one occasion. Mr. W. Bevan Lewis has had quite a different experience, for he has found these insects particularly abundant. My own experience is exactly similar. During the greater part of the spring and summer of this year I was staying in the vicinity of Berwick-on-Tweed, and have been much surprised at the abundance of these butterflies. From the beginning of June until nearly the end of August I saw numbers on the wing almost every day. Towards the end of the former month, from a single clump of nettles, about a yard square, I took, in a few minutes' time, between fifty and sixty larvæ, and I am sure there were hundreds more. With the exception of about half a dozen which died before they entered the pupa state, all the caterpillars successfully underwent their transformations. Some of the excluded butterflies were very fine and large specimens. Others were very small; I suppose because the larvæ were not sufficiently well fed. Whether the vicinity of Berwick-on-Tweed is ordinarily a good locality for the small tortoise-shell, I cannot tell, but this year they were exceedingly numerous.—*J. Landels, Regent's Park.*

Cats.—In the August number of Science-Gossip my friend Captain Noble related some instances of the sagacity of his favourite cat Brownie. Since then, while on a visit at his house, I witnessed a curious habit of the same animal which was omitted in his communication. If any one in her presence commences whistling a plaintive air Brownie will presently go to him, climb into his lap, and raising herself on her hinder legs will put her mouth close to that of the whistler. Captain Noble's view of the motive is that the cat imagines the performer to be in pain, and thus endeavours to express her sympathy. One day, when sitting round the table after dinner, we each for experiment attracted the animal in turn, who on the above supposition must have thought we were suffering from an epidemic, as each of us in succession exhibited the same symptoms. It is necessary that the air whistled should be of a plaintive character, as I found by commencing a lively measure, which I had to change. In my boyhood we had a cat which had a habit very similar. If I laid myself down on the sofa and made a moaning sound the cat would jump up and hover about me, as if anxious to find out what was the matter. Another curious and dog-like habit of Brownie's is her growling at any beggars that approach the house. One day, to exhibit this propensity, Mrs. Noble arrayed herself in cloak and bonnet, and leaning on a stick with a stooping gait slowly drew near the dining-room window where the cat was stationed. At first the animal appeared silent with astonishment, but on the supposed mendicant going round to another window, Brownie growled her displeasure very audibly—it was evident with due appreciation of her master's position as a magistrate. It may be added that the cat was then turned outside the house, and after a minute or so she seemed by her inattention to have detected the ruse.—*George Guyon, Ventnor, Isle of Wight.*

Here's a Radish!—Having just dug up a radish of unusual size, I send you the measurement, thinking it rather remarkable. Length, about 12 inches; girth at largest diameter, 13 inches; and greatest diameter, more than 4 inches. I have it now in my possession, and fancy it is the largest radish of the ordinary kind ever grown.—*C. S. Bentley.*

Lina populi.—In reference to the note attached to the article thus headed in the November number, there never has been, or could be, the least possible real confusion between *Chrysomelidæ* and *Coccinellidæ*. In the former, the tarsi are *tetramerous*, having four apparent joints. In the latter, they are *trimerous*, with only three. All the genera mentioned, *Timarcha*, &c., are absolutely sub-genera of *Chrysomela* proper, and not only several genera of *Chrysomelidæ*, but the families of *Gallerucidæ* and *Halticidæ* intervene between *L. populi* and the *Coccinellidæ*.—*R.*

"High Wycombe Journal."—The October number of this local journal contains an elaborate paper, with a coloured plate, of the "Crested Kingfishers of Africa." We cannot discover from the paper itself, or any other source, what connection there possibly can be between Madagascar and Bucks, or the Kingfishers of Africa and High Wycombe. We would suggest, as an equally pertinent subject for a future number, "The Cassowary of Timbuctoo."

"Everybody's Year-book" for 1870 is published, and contains a budget of useful and entertaining information. It deserves to make its title good by being in everybody's possession at the beginning of the year.

Insect Attractions.—Observing that "S. J. B." wishes to know whether Lepidoptera have been before observed to be attracted to the juice of a wounded tree, I beg to inform him that I have seen and caught not only *V. atalanta*, but also *V. polychloros* and *G. C.-album* under the same circumstances as those he relates, but I do not call to mind ever seeing members of other families of butterflies attracted in a similar way. I have also taken (and this is a useful hint) the two first-mentioned insects on the stains of the *sugar* of the night before. Has Mr. Williams tried spirits of salt to clean shells with?—*W. H.*

Starfish.—I have always understood that starfish, if eaten, produced all the symptoms of irritant poisoning, not only on cats, but on any animal that should be unlucky enough to eat one; and I was considerably astonished, therefore, when I was gravely informed that they were "good for pigs." Some few years ago I was living at St. Leonard's-on-Sea, and starfish vere very abundant; I cannot say if it is *generally* the case there, but I remember

at this particular time that they strewed the beach and sands in hundreds. One afternoon I observed a man and a boy who were busily employed in picking up starfish, and filling a truck with them, and not knowing any way in which they could be utilized, I had the curiosity to inquire, and was assured that pigs not only ate them with relish, but that starfish were "good" for pigs. I was previously aware of the omnivorous habits of a pig; but, as I say, starfish as a diet seemed not only unpleasant but improbable, and in spite of the repeated assertions of my informant that he used them for that purpose, I found great difficulty in swallowing the story. Perhaps, however, some of your readers may be able to corroborate.—*G. T. N.*

Diatom Markings.—I have not yet had an opportunity of trying Mr. Reade's Prism, but there are a good many persons who only have instruments of moderate power, and cannot afford to buy expensive apparatus. Now I find that if the microscope is tilted, and the light of the sun reflected from a white deal table, or black leather with a polished surface is used, the lines of the *Pleurosigma* are both brought out at once through the whole extent of the shell, and this with a lens which otherwise would require some management to show both sets of lines distinctly.—*E. T. S.*

Ladybirds.—I have read with interest an article on "Ladybirds," in No. 58, Oct., '69, and I beg to state that on more than one occasion I have seen several ladybirds alight on board ship on the Atlantic, *out* of sight of land, and very frequently between the coasts of Spain and Africa.—*E. A. Feilden, Bonchurch, Isle of Wight.*

Ligurian Bees.—In all reports of the merits of these bees over the Black Bee, I find it mentioned that they are more prolific, swarm oftener, more industrious, and provide *themselves* better, but no one has, as yet, mentioned that they make more honey for their masters. I should be glad to know, from those who have had experience of them, whether they fill glasses and supers as well or better than the Black Bees, or whether, like them, by giving plenty of room, they can be prevented swarming? I bought a good swarm of Ligurian Bees on the 2nd of last June, and hived in a Neighbour's Cottage Hive. They increased most rapidly. I put five glasses on, which were filled directly with bees, as full as they could hold. They worked more or less in all, but filled only two thoroughly. They still increased so much that I added a box, which filled immediately with bees, but they built no comb in it. I took about five pounds of honey from the glasses, and the weight of the bees and honey left (without the hive) is twenty-eight pounds, so that they are well provided for their own use, but so many bees might, I think, have made more honey in the glasses.—*W. A. E.*

Cockroach Eggs.—In the last number of Science-Gossip, p. 238, Mr. Andrews describes the egg of the Cockroach which he saw laid by the insect. I certainly never saw the act of deposition, but as it is said to occupy many days it is not unlikely that specimens might be captured during the operation. I would remark, however, that the object he terms "the egg" is not really so, but is the case in which the eggs are inclosed, each in a separate partition, and the longitudinal ridge he mentions is the slit through which the hatched larvæ issue. Sixteen is said to be the number of eggs in the egg-case of the common Cockroach. I was not aware that the ridge of the case was perpendicular to body of the insect in the act of extrusion, and can give no explanation on that point.—*G. Guyon, Ventnor, Isle of Wight.*

Sheep.—Is there any ground of truth in a statement made to me a few days ago by a man acquainted to some extent with such matters, viz., that if a sheep or goat bite the tender shoots of hedges, especially of holly or hawthorn, that the trees will not grow at that place again, and, besides, that oftimes the whole plant will eventually die? If so, how may it be accounted for?—*H. N.*

Chelifer and Fly.—In an article upon Pseudoscorpions, mention is made of a *Chelifer Latreillei* attached to a fly. Permit me to say that one evening a few weeks back, I also captured one, a male, exactly in the same manner. Whether it had fastened itself on in order to change its lodgings, or to make a meal of the fly, was precisely what I wish to find out. The fly was very small and weakly; the Chelifer strong and active. I saw the fly on the window at lunch, and noticed something attached to it, but missed taking it. Strange to tell, it dropped in my wine-glass at dinner, so that I secured both.—*George Macrae.*

"Cement Wanted."—Has G. C. Gowan tried the following: Place some balsam in a pot, and subject to a moderate heat: when cold it must be quite brittle; dissolve a portion in chloroform, and place some with the object on a glass slide; in a short time the chloroform will evaporate, leaving the object fixed.—*H. R. Warrington.*

Holly.—Thanks to the gentlemen who have corrected my Welsh. W. Williams is right; I am ignorant of my native language, but I was in South Wales when I wrote that little notice of the Holly. I had nearly forgotten the language, when one day, as I was decorating the grate in our seaside lodgings with ferns and ivy-leaves, the landlady's daughter remarked that it was a pity the "Hellig" had no berries on it now. I asked her what plant she alluded to; her reply was "the Holly," and then I remembered our Welsh servants in former days speaking of "Gren Hellig and *Grawn* Hellig" at Christmas-time, when they decorated the house with Holly. Science-Gossip arrived; the question with regard to the origin of the name Holly caught my eye, and with "Hellig" still in my ear, I offered a "fanciful" solution. I never then doubted "Hellig" being the Welsh for "Holly," and I feel sure now that many of the country people make the same mistake in South Wales, as most decidedly no "Willow" was ever brought into our house for decorative purposes but once, and that was when some young ladies (guests of my mother's) made a garland, and deputed me to hang it round a certain *old* gentleman's neck. There was not a Welsh dictionary at our lodgings, so I had to retreat to Miss E.'s mode of spelling Hellig. Now, on referring to my own I find "Holly" *Celynen*, and "Willow," *Helygen*. I fear we must go back to the old idea, that Holly comes from *Holy*-tree in allusion to its use in churches at Christmas.—*Helen E. Watney.*

Holly.—In Skinner's *Etymologicon Linguæ Anglicanæ*, I find the word Holly given as from the Anglo-Saxon Dolegn. Mr. Holland, I see, states that it is still called *hollin* "in many country places." The word he derives thus: "ab A.-S. Dal vel Dol, *Totus*, et Ecge *Acies*, q. d. Tota Acies, Tota Aculeata, seu Acuminata."—*G. Stringer Rowe, Southport.*

NOTICES TO CORRESPONDENTS.

D. G. W.—The *Journal of Botany* is published by Lovell Reeve & Co., monthly. 2s.

H. C. L.—Surely you cannot have read Mr. Wallace's article on "Mimicry" in the *Westminster Review*, or you would not think your observations new.

A. H.—Could you not start a journal of your own, in which your pugnacity would have free action?

C. J. W. R.—It is easy enough to have your bat named from the specimen. We cannot insert a long description for that purpose.

R. C.—The "Handbook of British Fungi" will be published at 15s. As soon as the names of 400 subscribers are obtained at Half a Guinea, the list will be closed. Already half the number have been received. Additional names may be forwarded to the Editor of SCIENCE-GOSSIP.

W. W.—It is an idle and slovenly habit with some entomologists to write only the initial letter of generic names, and should not be tolerated.

R. M.—We do not give art advice, but for our own purposes we use the water-colours manufactured by Brodie & Middleton of Long Acre. They are cheaper considerably, and quite as useful as those sold by the great "art establishments."

A. A.—It is undoubtedly the Humming-Bird Hawk-moth. True Humming-Birds belong to the New World.

W. H. P.—If the printers cannot decipher your names, the blame must rest with the writer.

W. H.—*Polypodium vulgare*, variety *serratum*. Lowe's Ferns, plate 30.—*J. G. B.*

F. W. W.—*Lastrea dilatata*, ordinary form.—*J. G. B.*

H. R. W.—Apparently seedling of *Pteris aquilina*.—*J. G. B.*

L. M. P.—"Newman's British Moths" contains the Sphinxes, but *not* the Butterflies. The latter may be had separately. It is not possible within the limits of a moderately priced book to give the older synonyms; some of these will be found in the British Museum Catalogues of Lepidoptera.

D. P. P.—Easily dissolved in nitric acid; probably organic, say, spores of conferva, but we cannot determine from the dried dust.

R. T. ANDREWS.—We wrote to the address named in your "Exchange" notice, and the letter is just returned "not known." Of course we have not inserted the notice. What can be the motive for a "hoax" of this kind?—not the first, unfortunately, which originated from our Exchange column. In justice to our readers, we are bound to watch for the delinquents, and exclude them for the future.

F. D., W. O., and G. B.—Your "Exchanges" are ineligible according to our rules, by which all objects are excluded which are not *bonâ-fide* natural history.

P. E. N.—The fly is *Borborus equinus* (order *Diptera*, tribe *Muscites*). It is generally distributed, and abounds near stables.—*F. W.*

R. H. N. B.—The insect is *Psocus abdominalis* (order *Neuroptera*, family *Psocidæ*). It feeds on vegetable substances.—*F. W.*

E. D. B.—Let them alone till the warm weather of spring arouses them. Reptiles require no food in winter.

M. B.—If "M. B." sent such specimens of mounted slides in exchange as we have seen from him, we are not in the least surprised that he got nothing for them. In such a case it would serve him right.

WATER for marine aquaria is supplied, fresh from the sea daily, at 3d. per gallon, by the London and Brighton Seawater Company, 2, Albert Mansions, Victoria Street.

J. F. C.—The objects referred to are glandular scales.

ST. E.—A volume published by the Society for Promoting Christian Knowledge would suit your purpose. We forget the precise title. The coloured illustrations you name are pretty good.

A. E. L.—"Mineral Statistics," published annually by the School of Mines in Jermyn Street.

W. L. W. E.—1. *Pottia minutula*. 2. *Hypnum molluscum*.—*R. B.*

J. B. L.—*Bryum pseudotriquetrum*.—*R. B.*

J. C. D.—4. *Frullania dilatata*. 5. *Pogonatum aloïdes*.—*R. B.*

J. E. M.—The New Zealand mosses are *Meteorium molle*, barren; *Eriopus cristatus*, in fruit.—*R. B.*

EXCHANGES.

INJECTIONS.—Good slides will be given for rare British Coleoptera (named).—Send lists to G. C. Gowan, 20, Beauchamp Square, Leamington.

LEPIDOPTERA.—*O. pudibunda*, *B. Quercus*, *S. carpini*, and others for exchange.—J. Purdue, Ridgeway, Plympton, Devon.

GREAT MULLEIN (*Verbascum Thapsus*) seeds. — Send stamped and directed envelope to Isaac Wheatley, Malling Street, Lewes (any microscopic object acceptable).

SPECIMENS of *Phragmoceras ventricosum*, or *pyriforme* (Silurian), *Clymenia linearis* (Devonian), *Goniatites evolutus*, or *Listeri* (Carboniferous), desired for other fossils.—Apply to the Rev. W. H. Painter, 49, Lee Crescent, Birmingham.

RARE PLANTS from Devon, Cornwall, and the London district in exchange for other rare plants.—Send lists to Mr. James Irvine, 28, Upper Manor Street, Chelsea, S.W.

TABELLARIA FLOCCULOSA (mounted) for good slides or material.—W. F. Haydon, 2, London Street, Norwich.

ELYTRA of Diamond Beetle, Sections of Hard Tissues, and other mounted objects for mounted objects.—H. W. H. C., 152, Holland Road, Kensington, W.

SPIRACLES, Elytra, legs and various parts of *Dytiscus marginalis*, Fossil Diatomaceæ from Bohemia, and other objects for good mounted objects.—Colonel Halliday, 152, Holand Road, Kensington, W.

DIAMOND BEETLES (*Curculio*), and Diatoms (*Meridion*), and others for any interesting objects (mounted or unmounted).—Rev. John Hanson, 1, Bagby Square, Woodhouse Lane, Leeds.

THREE good mounted Transparent Injections offered in change for living Trichinæ in flesh.—E. G. W., 3, Bertie Terrace, Leamington.

UPWARDS of a dozen Chrysalides of the Emperor Moth to be exchanged for British Shells.—H. J. Palethorpe, 32, Milton Place, Halifax.

SCALES of *Morpho menelaus* for other good objects (mounted).—J. W. Freeman, 165, Macey Road, Plumstead.

BOOKS RECEIVED.

"Everybody's Year-book for 1870." London: Wyman & Sons.

"The Management of Bees," by W. J. Pettitt. Dover.

"The English Mechanic." No. 241.

"The Monthly Microscopical Journal." No. 11. November, 1869. London: Robert Hardwicke.

"The 5, Bow Churchyard Magazine." No. 7. November, 1869.

"Le Naturaliste Canadien." No. 11. October, 1869.

"The Entomologist's Monthly Magazine." No. 66. November, 1869.

"Land and Water." Nos. 196, 197, 198, 199, 200.

"The American Naturalist." Vol. III. Nos. 8 and 9. October and November, 1869. Salem: Peabody Academy of Science.

"The American Entomologist." Vol. II. No. 1.

"The Chemical News." Nos. 513 to 520. London: Boy Court, Ludgate Hill.

"The Gardener's Magazine." October, 1869 (Monthly Part).

Bakerian Lecture.—"On the Continuity of the Gaseous and Liquid States of Matter," by Thomas Andrews, M.D., F.R.S. Reprinted from the *Proceedings of the Royal Society*.

"The Canadian Naturalist." Vol. III. No. 1. March, 1869. Montreal: Dawson Brothers.

"The Animal World." Nos. 1 and 2. Royal Society for Prevention of Cruelty to Animals.

"Scientific Opinion." Part XII. November, 1869. London: Wyman & Sons.

COMMUNICATIONS RECEIVED.—J. R. S. C.—E. C. R.—C. J. W. R.—J. C. M.—A. H.—E. T. S.—H. M. H. R.—G. T. N.—W. J. P.—A. M. F.—G. E. G.—J. E. R.—W. H.—C. F. T.—H. C. L.—T. W. F.—E. A. F.—W. L. W. E.—R. W.—A. H.—W. B. L.—J. H. L.—G. M—A. A.—H. R. W.—E. A. W.—J. P.—St. E.—D. G. W.—G. C. G.—G. S. R.—H. E. W.—L. M. P.—R. W.—J. S.—E. H.—D. P. P.—J. I.—W. D. R.—W. H. P.—I. W.—J. E. M.—J. W.—R. H.—R. T.—E. B. of W.—J. F. C.—T. W. F.—F. D.—H. J. P.—C. S. B. G.—M. B.—E. S.—H. W. H. C.—E. D. B.—G. B.—T. W. W.—J. L. E.—W. S.—S. A. S.—R. H. M.—J. G. N.—A. B.—W. F. H.—G. G.—E. G. W.—W. C. A.—W. K. S.—R. T. M. A.—J. E. H.—J. H. G.—H. B.—J. H.—W. F. H.—R. L.—J. W. S.—A. E. L.—E. H.—H. W.

INDEX TO VOL. V.

A BLUE-JACKET'S IDEA OF TECHNICAL NAMES, 68.
Abnormal Dandelions, 140.
Abnormal Erica, 190.
Abnormal Fruit of the Sloe, 186.
Abnormal Wallflower, 186.
About Cilia, 53.
Abyssinian Birds, 184.
Accordula tephronota, 274.
Acherontia atropos, 220, 257, 278.
Acineta tuberosa, 106.
Acontia luctuosa, 21.
Acorns, 45.
Actinoloba dianthus, &c., 56.
A Curious Fact, 21.
A 'Cute Squirrel, 234.
Admiral or Admirable? 262.
Admiral, the Red, 257, 262, 278.
Adventure in a Diatom, 212.
Aërolite, Large, 119.
Affectionate Tortoise, an, 233.
Affection between a Cow and Pig, 140.
Age of Fish, 141, 214.
Agrostemma, 189.
Alas, poor Dragon-fly! 95.
Alas, poor Hedgehog! 69, 142.
Alauda arvensis, 190.
Albino Birds, 22.
Alca alle, 279.
Alder Leaf-Buds, 66.
A Little Frog, 63.
Amebiu echioides, 191.
America, *Artemia salina* in, 113.
American Association for the Advancement of Science, 167.
American Deposit, 24.
American Entomologist (Magazine), 69.
American Silkworm, 249.
Amphiprora ornata, 109.
Anacharis alsinastrum, 239.
A Nameless Crustacean, 104.
Anatomy of the Blow-fly, 92.
Anatomy of the Zebra Mussel, 123.
An Ejectment for Ants, 47.
Anemones, Sea, 56, 90, 203, 210.
Aneroid Barometer, New, 189.
Animalcule, a Suctorial, 106.
Animalcule, the Crown, 130.
Animalcule, the Wheel, 97.
Animal from the Salt Lake, 78, 130, 234.
Animal Life, Duration of, 42.
Animals, Association of, 116, 119.
Antennæ of Entomostraca, 127.
Ants, an Ejectment for, 47.
Ants, House, 22.
Ape, the Barbary, 116.
Aphides, Parisitical Diptera in, 263.
Aphis Lion and Lacewing Fly, 15.
Ardea cinerea, 85.
Aregma bulbosum, 261.
Argynnis lathonia, 42.
Artemia salina in America, 113.
Arthronomalus longicornis, 69.
Ash-Trees, Violets under, 91, 116, 117, 166, 188, 189.
Asplenium trichomanes, 211.
Association for the Protection of English Sea-Birds, 10, 42.
Association of Animals, 116.
At Hastings, 214.
Atmospheric Phenomenon, 262.
Auk, the Little, 279.
Australian Bee, the, 277.
Australian Wild Horse, 160.

Bacillaria paradoxa, 139, 215.
Badger and Otter, the, 90, 118, 137, 258, 262, 277.
Badger in Cornwall, 210.
Badger in Norfolk, 166.
Balsam, Substitute for, 115.
Barbary Ape, 116.
Barometer, new Aneroid, 189.
Battledore Scales of Butterflies, 212.
Beech-tree, Parasites on, 259.
Bee Odours, 21, 68.
Bee Orchis, the, 235.
Bees, a Remedy, 71.
Bees Deserting, 263, 278.
Bees, Hybernation of, 41, 70, 93, 134, 164, 166.
Bees, Ligurian, 213, 237, 256, 263, 283.
Bees Swarming, 188, 191, 213, 237, 248.
Bee, the Australian, 277.
Beetles, something like, 191.
Berries, Christmas, 13, 93, 138.
Berries of the Laurel, &c., 47, 70, 114.
Birds, Albinism in, 22.
Birds, Association for the Protection of English Sea-Coast, 10, 42.
Birds, Early, 113, 136, 137.
Birds, Flight of, 214, 261.
Bittern, the, 113.
Blackbird's Nest on Christmas-day, 64.
Blackcaps, 65.
Black Rat, the, 118, 137, 262.
Bleaching Zoophytes, 213.
Blood Corpuscles, 142, 165, 190, 214.
Blow-fly, Anatomy of the, 92.
Blue-Bottles again, 262.
Blue Titmouse, the, 277.
Boiled Lobsters, 165, 213.
Bombyx Yama-mai, 63.
Books on Carboniferous Fauna, 46.
Borer, or Hag-fish, 117.
Botanical Allusion in Tennyson, 91, 116, 117, 166, 188, 189.
Bramble Brand, 261.
Brambles in Hedges, 280.
Brighton Anemones, 210.
Brighton Delicate, the, 258, 279.
British Animals, Rare, 69, 118, 160, 161.
British Association, 131, 207.
British Birds, 39, 85, 107, 113, 156, 179, 227, 253, 274.
British Fungi, Cooke on, 235.
British Geraniums, 151.
British Moth, a New, 42.
British Moths, 229.
Bryopsis, 165.
Bucks' Flora, 188, 214.
Buds as Objects for Winter Study, 34.
Bud-variation, 20.
Bullfinch, Food for, 215, 237, 238.
Bullfinch, the, 156.
Bunodes gemmacea, 56.
Butcher's Broom, 94.
Butterflies and Moths, Remarkable flight of, 273.
Butterflies, English Names of, 241.
Butterflies, Local Names of, 116, 140, 164.
Butterflies to the Rescue! 58.
Butterfly, Battledore Scales of, 212.
Butterfly, the Pale Yellow, 274.

CABBAGE-LEAVES, PROLIFEROUS, 119.
Candle, Moths in a, 185.
Capsella bursa-pastoris, 91.
Carboniferous Fauna, Books on, 46.
Carpels of Geraniums, 211, 235, 238, 261.
Carpological Books, 48.
Case Insect, 94.
Casting the Skin, 191.
Cat Devouring a Slow-worm, 161.
Caterpillars on the Willow, 261.
Cat Haws, 70, 93, 94, 116.
Cats, 188, 282.
Cats and Puff-balls, 164.
Cats and Starfishes, 214, 234, 239, 263 282.
Cats before a Storm, 117, 141, 164, 167.
Cats, do they eat Reptiles? 189.
Cats in the Water, 214.
Celandine, 52.
Cell, a New, 236, 281.
Cells for Microscopic Objects, 236, 260, 281.
Cells, Vulcanite, 139.
Cement Wanted, 262, 283.
Centipede, a Luminous, 46, 47, 69, 71.
Centre-barred Sallow, 234.
Ceramium ciliatum, 212.
Ceranthus Lloydii, 57.
Ceratites citriperda, 42.
Cheyleti, 5.
Chicago Microscopical Club, 54, 139.
Cholera Fungus, 43.
Christmas and the Microscope, 44.
Christmas Berries, 13, 94, 138.
Christmas-day, Blackbird's Nest on, 64.
Christmas, Wren's Nest at, 90.
Chrysalids Flying, 185.
Cilia, about, 53.
Ciliated Ceramium, 212.
Circea Lutetiana, 62.
Cirrœdia Xerampelina, 234.
Claytonia perfoliata, 114, 138.
Cleaning Shells, 237, 263, 282.
Climbers, Tropical, 247.
Clouded Yellow Butterfly, 17, 210.
Clove-pink Seeds, 132.
Clover Fields, Lepidoptera in, 21.
Club, the Woolhope, 225.
Coal-mine, new Entomostraca in a, 42, 111.
Coal-pits, Entomology in the, 65.
Coal Strata, Land-shell in the, 64.
Coal, the Story of a Piece of, 1, 46, 71, 96.
Cochlearia officinalis, 43, 66, 91, 114, 143.
Cockatoo, a Vagrant, 188.
Cockchafers, Uses of, 69.
Cock Nests, 68.
Cockroach Eggs, 238, 283.
Cold St. Valentine's, 116.
Colias edusa, 17, 210.
Collecting-box, Pocket, 116.
Collecting-case for the Microscope, 19, 120.
Comatula rosacea, 209.
Common Herbs, 178, 235, 268.
Companionship, 119.
Conium maculatum, 119, 142.
Convallaria verticillata, 259.
Convolvulus Hawk-moth, 16.
Cooke's British Fungi, 235.
Coral, Fossil, 119, 143.
Corallines, 198.
Corallines, to Repair, 46.
Cordylophora lacustris, 44.
Corn-cockle, 189.
Cornwall, the Badger in, 210.
Corpuscles of the Blood, 142, 165, 190, 214.
Courtship of Moths, 94.
Cow and Pig, Affection between, 140.
Cowslip, 189.
Crab, the Common Pea-, 210.
Crambus myellus, 42.
Crane in Norfolk, 160, 184.
Cranesbills, 151, 191, 262.
Cranesbill seed, 262.
Cratægus oxyacanthoides, &c., 22, 43, 118.
Crex pratensis, 161.
Crown Animalcule, the, 130.
Crustacean, a Nameless, 104.
Cuckoo-spits, 111.
Cuckoo, the, 16, 64, 65, 185, 262.
Cultivation of Wild Flowers for Garden Decoration, 169, 265.
Culture of Mistletoe, 23, 39, 68.
Cure for Toothache, 263.
Cure for Whooping-Cough, 164.

Curiosities, Museum, 70.
Curious Egg, 209.
Curious Martin, a, 190.
Cuttings from Roots, 138.
Cuttle-fishes, 218, 258.
Cynips aptera, 89.
Cynodon dactylon, 212.

Dace, Scales of the, 163.
Daddy Longlegs, 23, 89, 95.
Dandelions, Abnormal, 140.
Dartford Warbler's Nest, 184.
Death of a Tortoise, 165.
Death's-Head Moth, 220, 257, 278.
Deceiving the Nerves, 237.
December, Whin flowering in, 43.
Deep, Monsters of the, 55.
Deep-sea Dredging Expedition, 185.
Deep, Wonders of the, 209.
Defence of *Colias*, 210.
De gustibus non est disputandum, 277.
Dendritic Spots on Paper, 22, 46, 71, 80.
Deposit, Eger, 163.
Description, Popular, 238.
Deserting, Bees, 263, 278.
Devil-fish, 264.
Diatomaceæ, 22, 61, 67, 72, 92, 109, 139, 158, 163, 183, 187, 220.
Diatom, Adventure in a, 212.
Diatoms, Markings of, 236, 283.
Diatoms, Northumberland, 187.
Diatoms, Notes on New York, 109.
Diatoms, Sea-side, 220.
Dinornis, or *Moa*, 89.
Diptera, Parasitical in Aphides, 263.
Diseased Mouse, 22.
Diseases, new Vine, 59.
Dog Violets, 114.
Domestic Pets, Wasps as, 125.
Double-brooded, 279.
Down of Wild-fowl, 212.
Dragon-fly, Alas, poor, 95.
Drake, Green, 141.
Drawing from the Microscope, 87, 139, 165.
Dredging, Deep-sea, 185.
Dreissena polymorpha, 123.
Drying Leaves, 45.
Duration of Animal Life, 42.

Eagle in Norfolk, 160.
Early Birds, 113, 136, 137.
Earthworms, 161.
Economic Lamp-shade, 239.
Edinburgh Naturalists' Club, 187.
Eel, Scales of the, 187, 260.
Eger Deposit, 163.
Egg, a Curious, 209.
Egg Deformity, 142.
Egg, Large, 109, 144.
Eggs of Cockroach, 238, 283.
Eggs of Snails, 115.
Eggs, Small, 142, 167.
Electrical Insect, an, 239.
Embletonia Grayii, 70.
Emperor Moth, the, 257.
Enchanter's Nightshade, 62.
England, Humming-Birds in, 45.
English Names of Butterflies, 241.
English Plant-names, 25.
Entomological Society of London, 232.
Entomology in the Coal-pits, 65.
Entomostraca in a Coal-mine, 42, 111.
Entomostraca, Prehensile Antennæ of, 127.
Ephemera vulgata, 158.
Epidemics caused by Infusoria? 21.
Epistylis, 83.
Erica, Abnormal, 190.
Errata, 23, 48.
Everybody's Year-book for 1870, 282.
Expanded Zoophytes, 212.

Fact, a Curious, 21.
Fagus sylvatica, 259.
Falco tinnunculus, 179, 257.
Fauna, Books on Carboniferous, 46.
Fayberry, 162, 188.
Feather-star, the, 209.
February, Microscopic Objects in, 41.
Ferns, 66.
Fins of Goldfish, 23.
Fish, Age of, 141, 214.
Fishes, Tame, 160.
Fish-moth, 94, 118, 142.
Fish Scales, 12, 41, 67, 163, 187, 260, 281.
Fleas, 185, 277.
Flight of Birds, 214, 261.
Floral Giants, 9.
Flora of Bucks, 188, 214.
Flora of Middlesex, 259.
Flowering of Whin in December, 43.
Flowers dried in Sand, 70.
Flowers of the Ocean, 207.
Flowers, Spring, 121.
Flycatcher and Wren, 184.
Flycatcher's Nest, 258.
Flycatcher's Pellets, 107.
Fly, Chelifer and, 283.
Flying Chrysalis, 185.
Folk-lore, 23.
Food and Light, Influence of, on Lepidoptera, 273.
Food for Bullfinch, 215, 237, 238.
Food for Silkworms, new, 141.
Food of Tortoises, 140.
Food, Spiders as an Article of, 234.
Foot, Spider's, 136.
Foraminifera, 139, 262.
Fossil Coral, 119, 143.
Fossils at Walthamstow, 258.
Fossils? What are the, 23.
Fossil Wood, Sections of, 18.
Fragillaria Crotonensis, 109, 158, 183.
Freshwater Planariæ, 8, 48.
Freshwater Polyzoa, 131.
Fright, Rat dying of, 113.
Fringilla spinus, 39.
Fritillary, the Queen of Spain, 42.
Frog, a Little, 63.
Frog Parasites, 70.
Frogs, Tree, 161.
Fruit and Flower Gatherer, 239.
Fruit of the Hawthorn, 70, 93.
Fumart, the, 22, 45, 68.
Fungi, 141.
Fungia patellaria, 95, 143.
Fungi, British, 235.
Fungus, the Cholera, 43.

Gall-Bearing Plants, 66.
Garden Decoration, Wild Flowers for, 169, 265.
Garrulus glandarius, 253.
Geological Formation? What is a, 112.
Geological Puzzle, 95, 117.
Geophilus electricus, &c., 49, 65, 71.
Geranium Robertianum, 133, 191, 263.
Geraniums, British, 151.
Geraniums, Carpels of, 211, 235, 238, 261.
Geranium Seeds, 235.
Giants, Floral, 9.
Gizzard of the Mole-Cricket, 67.
Glastonbury Thorn, 43.
Glossy Ibis in Norfolk, 17.
Glowworms, 45, 71, 190.
Glowworm, Weatherwise, 45.
Gnats, 16.
Gold Crest, the, 42.
Golden Eagle in Norfolk, 160.
Goldfish Fins, 23.
Gold, Sutherland, 227.
Gooseberry, Local Name of, 162, 189.
Gorse Flowering in December, 43.
Grasses, a Handful of, 172.
Great Titmouse, the, 277.
Green Drake, 141.
Greengage, Growth in, 46.
Green Lizard, the, 126.
Grouse, the Red, 116, 141.
Growth in Greengage, 46.
Growth in the Lemon, 21.
Gryllotalpa vulgaris, 60, 67, 95.
Gudgeon, Scales of the, 41, 67.

Habenaria bifolia, &c., 162, 186, 191.
Habits of House Mice, 93.
Hailes' Lamp-Shade, 239.
Hair and its Restorers, 93.
Hair, Plantain, 114.
Hairs, Vegetable, 165, 268.
Hag-fish, or Borer, 117.
Hagg-worm, 117.
Half and Half, 22.
Handful of Grasses, 172.
Hare's Fur in Winter, 118.
Harriers in Norfolk, 160.
Hastings, at, 214.
Hawfinches in Norfolk, 160.
Hawk-Moths, 16, 119, 220, 234, 257, 273.
Hawk's Home, 184.
Hawthorn, 22, 23, 43, 70, 93, 116, 118.
Hedgehog! Alas, poor, 69, 142.
Helix lamellata, 90.
Helix nemoralis, 113.
Hemiptera for the Microscope, 115.
Hemlock, 119, 142.
Hen's Nest, Singular Place for a, 64.
Herbaria, 216.
Herb Robert, 133, 191.
Herbs, Common, 178, 235, 268.
Here's a Radish! 282.
Heron, the, 85.
High Wycombe Journal, 282.
Hints for Workers, 236.
Holm Oak, Scales of the, 214.
Holly, the, 213, 235, 238, 259, 280, 283.
Honey-dew, 192.
Honour to whom Honour is due, 262.
Hornbills at Home, 136.
Horse, the Australian Wild, 160.
House Ants, 22.
House Martins in November, 22.
Human Parasites, Recipe for, 257.
Humble Bee, Winter Home of the, 41, 134, 164, 166.
Humming-Birds in England, 45.
Hybernation of Bees, 41, 70, 93, 134, 164, 166.

Ianthina, 31, 64.
Ibis, the Glossy, in Norfolk, 17.
Ice, does Water expand in becoming? 21.
Ignis fatuus, 60, 95.
Illinois, State Microscopical Society of, 54, 139.
Imperfectly Developed Plants, 99.
Imported Insects, 136.
Incident of a Thrush, 257.
Indian Pink, Leaf of, 164, 213.
India-rubber Cells, 236, 281.
Indigenous Trees, 140.
Infants, Precocious, 263.
Influence of Food and Light on Lepidoptera, 273.
Influence of Light on Insects, 57, 77, 137, 165, 188, 273.
Infusoria, do they cause certain epidemics? 21.
Insect, an electrical, 238.
Insect Attractions, 282.
Insect, new, from Ceylon, 84.
Insects, Imported, 136.
Insects in 1869, 233, 234.
Insects, Light attracting, 57, 77, 137, 165 188.
Insects of the Season, 233, 234.
Insects, Preservation of, 165.
Insects, to Mount Small, 163.
Insect Trap, 238.
Insect Visitation, 231.
Interloper, an, 140.
Invasion of Ladybirds, 267.
Ipswich Science-Gossip Society, 214.
Ivy, the, 238.

Jack, Voracity of the, 233.
January, Young Starlings in, 7.
Jaundice, Recipe for, 141.
Jay, the, 253.
Jews and Fleas, 185.
Journal, Monthly Microscopical, 187.
Journals, Transatlantic, 181.
Jumart or Fumart, 22, 45, 69.

Kestrel, the, 179, 257.
Knaggs' Lepidopterist's Guide, 159.

Lacerta viridis, 126.
Lacewing Fly, Aphis Lion and, 15.
Ladybird, Ladybird, fly away home! 239, 283.
Ladybird, Lay of the Old, 232.
Ladybirds, the Invasion of, 267.
Lamperns, 45, 71.
Lampreys and Lamperns, 145.
Lamp-Shade, Economic, 239.
Land Leeches, 76.
Landrail, the, 161.
Land Shell in the Coal Strata, 64.
Lapwing's Egg, 167.
Lapwing, the, 107.
Large Aërolite, 119.
Large Egg, 109, 144.

Larvæ, Variable, 23.
Lastrea montana, 259.
Late-Feathered Family, 279.
Laurel-Berries, &c., 47, 70, 114.
Laurel-Leaves, 20, 45, 68, 71.
Lay of the Old Ladybird, 232.
Leaf-Buds, 34, 66.
Leaf of Indian Pink, 164, 213.
Leamington Microscopical Society, 281.
Leaves, Drying, 45.
Leeches, 93, 143, 161, 165.
Leeches, Land, 76.
Legal Zoology, 17.
Lemon, Growth in, 21.
Lepidoptera, Influence of Food and Light on, 273.
Lepidopterist's Guide, by Dr. Knaggs, 159.
Lepisma saccharina, 94, 118, 142, 163.
Leucania vitellina, 258, 279.
Life, the Origin of, 93.
Light and Food, Influence of, on Lepidoptera, 273.
Light Attracting Insects, 57, 77, 137, 165, 188.
Light for Drawing, More, 165.
Ligurian Bees, 213, 237, 256, 263, 283.
Lilac in October, 47.
Lina Populi, 249, 282.
Linaria cymbalaria, 211.
Little Mackerel, 21.
Littorina littorea, 117.
Live-Box, 115.
Lizard, the Green, 126.
Lizard, the Sand, 90.
Lobelia urens, 235.
Lobsters, Boiled, 165, 213.
Local Name of Wasp, 261.
Local Name of the Gooseberry, 162, 189.
Local Names, 9.
Local Names of Butterflies, 116, 140, 164.
Locusta migratoria, 258.
Locust, Oriental, 258.
London, Entomological Society of, 232.
Long Sleeper, a, 166.
Lowne, B. T., on the Blow-fly, 92.
Lucerne Fields, 21.
Luminous Centipede, 46, 47, 69, 71.

Machetes pugnax, 274.
Mackerel, Little, 21.
Macrospores, 88.
Magnetic Stage, 115.
Maiden-Hair Fern, 211.
Maiden Oak, 143.
Maiden Trees, 164.
Maigre at Brighton, 17.
Management of Leeches, 93, 143, 161, 165.
Maps, Silurian, 45.
Marjoram, 178, 235.
Markings on Diatoms, 236, 283.
Martin, a Curious, 190.
Martins in November, 22.
Maxime Miranda in minimis, 187.
May-fly, the, 158.
Medusæ, 82.
Megascolex diffringens, 161.
Melicerta in Families, 281.
Mergus albellus, 17.
Mice, Habits of House, 93.
Mice on the Sill, 233.
Microscope at Southend, With the, 217.
Microscope, Christmas and the, 44.
Microscope, Drawing from the, 87, 139, 165.
Microscope Exhibition in America, 167.
Microscope, Hemiptera for the, 115.
Microscope, the, 163.
Microscopical Club at Chicago, 54, 139.
Microscopical Manipulation, 243, 281.
Microscopical Research, 177, 230.
Microscopical Societies, Soirées of, 64.
Microscopic Collecting-case, 19, 120.
Microscopic Objects, Cells for, 236, 260, 281.
Microscopic Objects of the Months, 19, 41.
Microscopic Preparation, 143, 165.
Middlesex, Flora of, 259.
Mildness of the Season, 72.
Millipede, the Pill, 17.
Missel-Thrush and Missel-Toe, 164, 189.
Mistletoe, Culture of the, 23, 39, 68.
Mistletoe, the, 138, 162, 167.
Moa, the, or Dinornis, 89.
Mochras, 213.
Mole-Cricket, 60, 67, 95.
Moles, Suspended, 165.
Mollusc, new Nudibranchiate, 70.
Monograph of *Thuja*, 43.
Monstera deliciosa, 20.
Monsters of the Deep, 55.
Monthly Microscopical Journal, 187.
More Light for Drawing, 165.
Morning Visitors, 258.
Mosquitoes, 17, 54.
Mosquitoes at Woolwich, 17.
Moth, a new British, 42.
Moth-courtship, 94.
Moths and Butterflies, remarkable Flight of, 273.
Moths in a Candle, 185.
Moth, the Fish-, 94, 118, 142.
Moth, the Oak Eggar, 226.
Mounting Small Insects, 163.
Mouse, a Diseased, 22.
Museum Curiosities, 70.
Mushroom, a Winter, 91.
Mushrooms, 70.
Music, Pigs and, 68.
Myriapods, 49.
Myxine glutinosa, 117.

NAMES, LOCAL, 9, 25.
Names of English Plants, 25.
Names, Vulgar, 21.
Name? What's in a, 21, 45, 116.
Naturalists' Club in Edinburgh, 187.
Natural Snail-Trap, 143.
Navicula hippocampus, 22.
Nereis bilineata, 166.
Nerves, Deceiving the, 237.
Nesting of the Lesser Redpole, 89.
Nest of Dartford Warbler, 184.
Nest of Flycatcher, 258.
New Aneroid Barometer, 189.
New British Moth, 42.
New Cell, a, 236, 281.
New Entomostraca, 42.
New Food for Silkworms, 141.
Newhaven, Sword-fish off, 185.
New Insect from Ceylon, 84.
Newman's British Moths, 229.
New Nudibranchiate Mollusc, 70.
New Peziza, 162.
New Surirella, 60.
New Vine Diseases, 59.
New York Diatoms, Notes on, 109.
Nightingale, the, 46, 188.
Nightshade, the Enchanter's, 62.
Norfolk and Norwich Naturalists' Society, 139.
Norfolk, Rare Birds in, 160, 161, 184, 192.
Norfolk, Short-eared Owl in, 257.
Norfolk, the Badger in, 166.
Norfolk, the Crane in, 160, 184.
Norfolk, the Otter in, 137.
Northumberland Diatoms, 187.
Nose-pieces, Substitute for, 18, 46.
Note, a Northern, 166.
Notes of the Seasons, 167.
Notes on New York Diatoms, 109.
Notice! 164.
Notions, Odd, 129.
November, House Martins in, 22.

OAK EGGAR MOTH, THE, 226.
Oak-feeding Silkworm, 63.
Oak, the, 166.
Oak, the Maiden, 143.
Obisium, 245.
Object for the Polariscope, 44.
Objects for Winter Study, 34.
Ocean, Flowers of the, 207.
October Lilac, 47.
Odd Notions, 129.
Odours of Bees, 21, 68.
Olive in Bloom, 235.
Ommastrephes giganteus, 55.
On the Alcoholic Compound called Punch, 215.
Ophrys lutea, 138.
Orange-fly, 42.
Oranges, 213,
Orchids Wanted, 143, 166.
Orchis, the Bee, 235.
Orgyia antiqua, 94.
Oriental Locust, 258.
Origin of Life, 93.
Orthosira punctata, 110.
Otter and Badger, the, 90, 137, 258.
Otter in Norfolk, 137.
Otters, 90, 118, 137, 161, 165, 184.
Otters in Yorkshire, 161.
Owl, the Short-eared, 227.
Oxalis acetosella, 20, 43, 162, 166, 186.
Oxalis, Tree, 280.

PADGEY-POW, 142.
Pale Yellow Butterfly, 274.
Palm Branches, 167.
Paper, Dendritic Spots on, 22, 46, 71, 80.
Parakeets Breeding, 89, 140, 166.
Parasites of the Frog, 70.
Parasites, Recipe for Human, 257.
Parasitical Diptera in Aphides, 263.
Parus major and *cæruleus*, 277.
Past Year, the, 1868, 10.
Pea-crab, the Common, 210.
Pecten opercularis, 209.
Pectinaria Belgica, 210.
Peewit, or Lapwing, 107.
Pellets of Flycatchers, 107.
Petromyzon marinus, &c., 71.
Peziza, a new, 162.
Pheasant's Legs, Scales from, 44.
Phenomenon, Atmospheric, 262.
Phronima, 73.
Phul-supyari, 213.
Phyllactidium pulchellum, 67.
Physalia, 42.
Picus major, 279.
Pig and Cow, Affection between, 140.
Pigs and Music, 68.
Pine Pollen, 92.
Pining Tortoise, 116, 140, 143.
Pipits, 71.
Planariæ, Freshwater, 8, 48.
Plantago coronopus, 280.
Plant-names, English, 25.
Plants, Imperfectly Developed, 99.
Plants which bear Galls, 66.
Plea for Science Schools, 95.
Pleurosigma hippocampus, 22, 67, 92.
Pocket Collecting-box, 116.
Poduræ, 248.
Polariscope, Object for the, 44.
Pollen of the Pine, 92.
Polyommatus alsus, 185.
Polystichum aculeatum, 162.
Polyzoa, Fresh-water, 131.
Poor Prisoner, a, 185.
Poppy Seeds, 11.
Popular Description, 238.
Postage, Reduced Scientific, 141.
Potentilla, Orange Spotted, 280.
Potentilla tormentilla, &c., 47, 66, 91, 119, 280.
Precocious Infants, 213.
Prehensile Antennæ of Entomostraca, 127.
Preparation, Microscopic, 143, 165.
Preservation of Insects, 165.
Prickly Fern, 162.
Prickly Pear as a Microscopic Object, 281.
Primula veris, 189.
Prisoner, a Poor, 185.
Proliferous Cabbage-leaves, 119.
Prophet's Flower, the, 191.
Protection of Sea-birds, 10, 42.
Proteus anguinus, 135.
Pseudo-scorpions, 243.
Pterodactyles, 254.
Puff-balls, Cats and, 164.
Punch, the Alcoholic Compound called, 215.
Puss, a Sympathetic, 233.
Puzzle, a Geological, 95, 117.
Pyrrhula vulgaris, 156.

QUEEN OF SPAIN FRITILLARY, 42.
Quekett Microscopical Club, 60, 70, 139.
Query, a Sand, 95, 119.
Quilkin, 142.

RABBIT, DR. THUDICHUM'S, 182, 214, 237
Radish, Large, 282.
Ranunculus tripartitus, 20.
Rare Birds in Norfolk, 160, 161.
Rare British Animals, 69, 118, 262.
Rat Dying of Fright, 113.
Rat Mischief, 142.
Rats, 69, 80, 113, 142.
Rats and Sugar, 69.

Rat, the Black, 118, 137, 262.
Raven, a Curious Fact about, the, 21.
Reading, *Colias edusa* in, 210.
Recipe for Human Parasites, 257.
Recipe for Jaundice, 141.
Red Daddy Longlegs, 23.
Red Grouse, 116, 141.
Redpole, Nesting of the Lesser, 89.
Reduced Scientific Postage, 141.
Regulus cristatus, 42.
Remarkable Flight of Moths and Butterflies, 273.
Remarkable Trio, 182.
Reptiles, do Cats Eat them? 189.
Research, Microscopical, 177, 230.
Rhamnus frangula, 141.
Root Cuttings, 138.
Rudd, Scales of the, 12.
Ruff and Reeve, the, 274.
Ruscus aculeatus, 94.

Sage, 268.
Salmon in Maine, 184.
Salmon, Scales of the, 260.
Salt Lake, Animal from the, 78, 130, 234.
Samlets, 213.
Sand, Flowers dried in, 70.
Sandhoppers, 195.
Sand Lizard, 90.
Sand Query, a, 95, 119.
Sand-worm, 210.
"Sarment" in a Sussex Stone-pit, 175.
Saturnia pavonia minor, 257.
Scales of Butterflies, 212.
Scales of Holm Oak, 214.
Scales of the Dace, 163.
Scales of the Eel, 187.
Scales of the Gudgeon, 41, 67.
Scales of the Rudd, 12.
Scales of the Salmon, 260.
Scales of the Trout, 281.
Scallop, the, 209.
Scarce Spotted Hawk-Moth, 234.
Science-Gossip Society, 214.
Science Schools, a Plea for, 95.
Scientific Postage, Reduced, 141.
Scilla autumnalis, 235.
Sciæna aquila 17.
Scirpus parvulus, 162.
Scolopendrium ceterach, 66, 91.
Scurvy Grass, 43, 66, 67, 91, 114, 143.
Sea Anemones, 56, 90, 198, 210.
Sea Anemone, Voracity of the, 90.
Sea Birds, Association for the Protection of English, 10, 42,
Sea Bottom Chalk, 213.
Sea Grapes, 197.
Seaside Diatoms, 220.
Sea-snail, the Violet, 31, 64.
Season, Insects of the, 233, 234.
Seasons, Notes of the, 167.
Sea Swallow at Sydenham, 17.
Seaweeds, 107.
Seaweed, Under the, 193.
Sections of Fossil Wood, 18.
Seeds, List of Works on, 48.
Seeds of Clove-pinks, 132.
Seeds of Cranesbill, 262.
Seeds of Geraniums, 235, 262.
Seeds of Poppies, 11.
Seeds of Vegetables, 143.
Serin Finch, 167.
Serinus meridionalis, 167.
Sertularians, 198.
Shamrock, the, 66, 91, 138, 162, 166, 167, 186.
Sheep, 283.
Sheldrake, the Ruddy, in Norfolk, 160, 184, 192.
Shells, Cleaning, 237, 263, 282.
Short-eared Owl, 227, 257, 278.
Silkworm, Oak-feeding, 63.
Silkworm, the American, 249.
Silkworms, New Food for, 141.
Sill, Mice on the, 233.
Silurian Maps, 45.
Singular Place for a Hen's Nest, 64.
Siskin, the, 39.
Skin, Casting the, 191.
Skylark, 190.
Sleeper, a Long, 166.
Sloe, Abnormal Fruit of, 186.
Slow-worm Devoured by a Cat, 161.
Smew, the, 17.
Snail's Eggs, 115.
Snail-Trap, a Natural, 143.
Snakes, 119.
Snipe, 118.
Snow-Bunting, 45, 278.
Snow in Summer, 166.
Soirées of Microscopic Societies, 60.
Something Like Beetles, 191.
Southend, With the Microscope at, 217.
Sparrows, Value of, 215.
Sphinx convolvuli, 16.
Sphinx Galii, 234.
Spider Crab, 194.
Spiders as an Article of Food, 234.
Spider's Foot, 136.
Spider Silk, 185.
Spiders Suspending a Stone, 47, 94, 118.
Spirorbis, 95.
Spirorbis Nautiloides, 194.
Spirulina, 260.
Spotted Woodpecker, the, 279.
Spring Flowers, 121.
Squirrel, a 'Cute, 234.
St. Mary Redcliffe, Bristol, 282.
St. Valentine's, Cold, 116.
Stage, a Cheap Magnetic, 115.
Starfish, 209.
Starfish, Cats and, 214, 234, 239, 263, 282.
Starlings in January, 71.
Stone, Spiders Suspending a, 47, 94, 118.
Storm, Cats before a, 117, 141, 164, 167.
Story of a Piece of Coal, 1, 46, 71, 96.
Strix brachyotus, 227, 257, 278.
Sturgeon in the Wye, 210.
Substitute for Balsam, 115.
Substitute for Nose-pieces, 18, 46.
Suctorial Animalcule, 106.
Sugar Moth, 94, 118.
Sugar, Rats and, 69, 80.
Sundew, 91, 117, 190.
Sundew, Neilgherry, 181.
Surirella, a New, 61.
Suspended Moles, 165.
Sussex Stone-pit, a "Sarment" in a, 175.
Sussex, the Otter in, 184.
Sutherland Gold, 227.
Swiney Lectures, the, 141.
Sword-fish taken off Newhaven, 185.
Sympathetic Puss, 233.
Symphytum tuberosum, 138.

Tame Fishes, 160.
Technical Terms, a Blue-Jacket's Idea of, 68.
Telea polyphemus, 249.
Tennyson, Botanical Allusion in, 91, 116, 117, 166, 188, 189.
Tern at Sydenham, 17.
Testacella, 143.
Thames, Trees by the, 20.
The Past Year, 1868, 10.
The Woolhope Club, 225.
Thrips, 116.
Thrushes, Unfledged, 279.
Thrush, Incident of a, 257.
Thudichum's, Dr., Rabbit, 182, 214, 237.
Thuja, Monograph of, 43.
Tingis hystricellus, 84.
Titmouse, the Great and the Blue, 277.
Titmouse, the Turkish Long-tailed, 274.
Toad Flax, 211.
Tolmen, the, 117.
"Tommy Try," 82.
Tom-Toddies, 164, 237.
Toothache, Cure for, 263.
Tormentilla, 47, 66, 91, 119.
Tortoise, an Affectionate, 233.
Tortoise, a Pining, 116, 140, 143.
Tortoise, Death of a, 165.
Tortoises in Winter, 278.
Transatlantic Journals, 181.
Trap for Insects, 239.
Trap for Snails, a Natural, 143.
Tree-frog, 161.
Tree Oxalis, the, 280.
Trees by the Thames, 20.
Trees, Indigenous, 140.
Trees, Maiden, 163.
Trichina spiralis, 42.
Trio, a remarkable, 182.
Triodon, the, 237.
Trocheta subviridis, 76.
Tropical Climbers, 247.
Trout, Scales of the, 281.
Turkish Long-tailed Titmouse, 274.
Turtledove, 142.

Under the Seaweed, 193.
Urocystis oryzæ, 43.
Uses of Cockchafers, 69.
Utricularia, 22, 67.

Vagrant Cockatoo, 188.
Value of Sparrows, 215.
Vanellus cristatus, 107.
Vanessa atalanta, 257, 262, 273, 278.
—— *cardui* in London, 168.
—— *urticæ*, 282.
Variable Larvæ, 23.
Variable Weather, 189.
Variety of *Plantago coronopus*, 280.
Vegetable Hairs, 165, 268.
Vegetable Seeds, 143.
Veronica Buxbaumii, 211, 259, 280.
Vine Diseases, new, 59.
Violets, Dog, 114.
Violet Sea-snail, the, 31, 64.
Violets under Ash-trees, 91, 116, 117, 166, 188, 189.
Visitation of Insects, 231.
Visitors, Morning, 258.
Volvox globator, 166.
Voracity of the Jack, 233.
Voracity of the Sea Anemone, 90.
Vorticellæ, or Bell Infusoria, 92, 117.
Vulcanite Cells, 139.
Vulgar Names, 21.

Wallflower, Abnormal, 186.
Walthamstow, Fossils at, 258.
Wasp, Local Name of, 261.
Wasps, 68.
Wasps as Domestic Pets, 125.
Water, does it expand on becoming Ice? 21.
Water Wagtails, 68.
Weather, Variable, 189.
Weatherwise Glowworm, 45.
What are the Fossils? 23.
What is a Geological Formation? 112.
What's in a Name? 21, 45, 116.
Wheel Animalcule, 97.
Whin Flowering in December, 43.
Whooping-Cough, Cure for, 164.
Whooping-Cough, Preventive for, 263.
Why? 22.
Wild Flowers, Cultivation, &c., for Garden Decoration, 169, 265.
Wild Fowl, Down of, 212.
Wild Horse, the Australian, 160.
Will-o'-the-Wisp, 60, 95.
Willow, Caterpillars on the, 261.
Wiltshire, Otters and Badgers in, 258.
Winter, Hare's Fur in, 118.
Winter-home of the Humble Bee, 41, 70.
Winter Mushroom, 91.
Winter Study, Buds as Objects for, 34.
With the Microscope at Southend, 217.
Wolfia arhiza, 138, 162.
Wonders of the Deep, 209.
Woodlouse, the, 17.
Woodpecker, the Spotted, 279.
Wood, Sections of Fossil, 18.
Wood-sorrel, the, 20, 43, 162.
Woolhope Club, the, 225.
Woolwich, Mosquitoes at, 17.
Workers, Hints for, 236.
Wren and Flycatcher, 184.
Wren's Nest at Christmas, 90.
Wurali, 126.
Wye, Sturgeon in the, 210.

Year, the Past, 1868, 10.
Yorkshire, the Otter in, 161.
Young Starlings in January, 71.

Zebra Mussel, Anatomy of the, 123.
Zoology, Legal, 17.
Zoophytes, 44.
Zoophytes, bleaching, 213.
Zoophytes, to Kill expanded, 212.

WYMAN AND SONS, PRINTERS, GREAT QUEEN STREET, LONDON, W.C.

082ch
1870
c. 2

7796 Spare copies behind.- {WF.4 Inv. 3535

OSLER [sir] W[illiam] (1849-1919)

Christmas, Merry, and the microscope. [Worcester, Mass., priv. pr., Harrigan pr., Dec. 1940.]

[8] p. (3 blank); illus. O(la.8vo)

Type-facs. of the 1869 paper, with "Merry Christmas" introd. by Frances & John Fallon.

Inserted, with corresp., 1942, in #3555.

B.O. No. 3535 OSLER, sir William
Christmas and the Microscope ... 1869. WF 4

The material in this envelope belongs with no. 3535

(082ch 1870)

McGILL UNIVERSITY
MONTREAL 2, CANADA

acc'd as pamphlet "520"

B.O. No. 3535 OSLER, sir William
Christmas and the Microscope ... 1869. WF 4

The material in this envelope belongs with no. 3535

(082ch 1870)

McGILL UNIVERSITY
MONTREAL 2, CANADA

Dr. W. W. Francis
in appreciation.
Larry Evans.

A Holiday Greeting
from the
Clendening Medical Library

Sir William Osler's first publication
"CHRISTMAS AND THE MICROSCOPE"
reproduced from
Hardwicke's Science Gossip, 1869

University of Kansas
School of Medicine
Kansas City, Kansas
1957

Gen. Pr. WZ 3535

HARDWICKE'S

Science-Gossip:

AN ILLUSTRATED MEDIUM OF INTERCHANGE AND GOSSIP

FOR STUDENTS AND

LOVERS OF NATURE.

EDITED BY M. C. COOKE,

AUTHOR OF "A PLAIN AND EASY ACCOUNT OF THE BRITISH FUNGI," "MICROSCOPIC FUNGI," "A MANUAL OF BOTANICAL TERMS," AND OF "STRUCTURAL BOTANY," THE "BRITISH REPTILES," ETC. ETC.



LONDON:

ROBERT HARDWICKE, 192, PICCADILLY.

1870.

MICROSCOPY.

Christmas and the Microscope.—

Nec jam sustineant onus,
Sylvæ laborantes, geluque
Flumina constiterint acuto,

might well be said of Canadian woods and streams at this season of the year. The earth has put on her winter robes, and under them she hides most of those objects which in summer please and delight us so much. A cheerless prospect for microscopists, one would think. So I thought, as on Christmas afternoon I sallied out with bottles and stick in search of diatoms, infusoria, snow-peas, &c., though I did not expect to be very successful. After wandering about for some time, searching vainly for an unfrozen stream, I was about to return home with empty bottles, when I suddenly bethought myself of an old spring which supplied several families with water, and which I knew therefore would be unfrozen. In this country, wherever there is a good spring some kind individual sinks a barrel for the benefit of the community at large, and thereby benefits microscopists in no small degree, for in these you are generally sure to find a good supply of microscopic objects. When I got to the spring the first thing that greeted my sight was a piece of algæ floating on the top of the water, and on a closer examination of the barrel I saw that the sides had a dark-brown coating, in which I knew diatoms and infusoria would be found. Scraping some of this off, I placed it in a bottle and retraced my steps homeward, well satisfied with my afternoon's walk. Getting home at that unfavourable time for working, just as the light is beginning to fail, I had to exercise my patience and wait till evening to see what my bottle contained. I had not long to wait, as darkness soon succeeds the light here: so when I had got a lamp lighted, I proceeded to examine my spoils. A short account of the things I found may not be uninteresting to English readers of the Science-Gossip, as it will give them some idea of what lovers of science meet with in this country. Upon putting a slide under the microscope before I had it properly focussed, I saw the dim outline of some little creature kicking and struggling as though it were caught in a net. It turned out to be one of the Tardigrada, or little water-bears, that had got its feet entangled in the gelatinous tube of the *Encyonema prostratum*. It was with great difficulty that it freed itself from the jelly, and then it began its slow and stately walk, which formed such a contrast with the quick, lively movements of the animalcules with which it was surrounded. The little water-bears are by no means common objects with us, but it only makes them the more acceptable when we chance to get them. The *Encyonema prostratum* seems to delight in these quiet water-barrels, though it is occasionally found on the wave-washed Cladophora of our lakes. They always remind me of the manner in which peccaries sleep, packed closely together in hollow logs. I have seen the *Encyonema* shoot out of its tube, but whether it can find its way back again or not I do not know. Two species of *Euglenæ* were very plentiful, viz., the *E. viridis* and *E. acus*. They are found here in the spring in such numbers as to give to the water they are in a dark green colour. The *Paramecium aurelia* and *Kolpoda cucullus* were in great abundance. Among other Infusoria were the *Amphileptus anser*, two species of *Vorticellinæ* and the *Leucophrys patula*. Of Desmids there were three species: *Closterium acerosum*, *Cosmarium undulatum*, and *Scenedesmus quadricauda*. Of Diatoms, besides the *Encyonema*, the following species were present: *Gomphonema coronatum*, *G. minutissimum*, *Melosira varians* (Thwaites), *Fragillaria rhabdosoma*, *Meridon vernale*, *Navicula amphirhynchus*, *N. librile*, *Hyalosira rectangula*, *Synedra splendens*, *Cymbella gastroides*, and some others.—*W. Osler, Dundas, Ontario.*

Object for Polariscope.—The skin and scales covering the legs of a pheasant make a very pretty object for the polariscope. The scales should be cleared from fat by immersion in ether or dilute liquor potassæ, dried between slips of glass, soaked in turpentine until quite transparent, and finally mounted in balsam. The colours are very bright if a selenite stage is used.—*J. H., Cheltenham.*

Cordylophora lacustris.—The only habitats I find recorded for this interesting zoophyte are docks in London and Dublin, where there would, I suppose, be some admixture of salt water sometimes, though Professor Allmann says he kept specimens for a fortnight in fresh water. Last June a specimen was found by a friend of mine on a piece of old canal-boat, which we were examining for polyzoa, lying on the Birmingham Canal at Tipton. I subsequently found this zoophyte in the Stourbridge Canal, close by the town; and I also obtained a luxurious gathering from a pool near Pensnett, Dudley, where it was lying close to the side, attached to a small stick, and exposed to the full glare of the August sun. I transferred this colony to my aquarium, where it is still (Nov. 16) flourishing. The zoophyte does not seem therefore to avoid light, though, I suppose, when so exposed, it is frequently destroyed by the more rapid growth of Confervæ. Johnston only gives a short account of it in his 2nd edition, and derives the name from κόρδυλος (a water-newt) instead of κορδύλη (*clava*, a club).—(*See* Professor Allmann's admirable paper in *Philosophical Transactions*, 1853.) An interesting account of it also, by the Rev. T. Hincks, is to be found in *Ann. and Mag. Nat. History*, 1853.—*W. Madeley, Pensnett, near Dudley.*

FALLON CLINIC
390 MAIN STREET
WORCESTER, MASSACHUSETTS

SURGERY
DR. JOHN FALLON

January 20, 1942

Dr. W. W. Francis
McGill University
Montreal, Canada

Dear Doctor Francis:

I have had time yet neither to read "Osler Day" nor to correct my "seventeen" and "Desmids". More later when I do.

This is just an immediate note to thank you for your delightful letter (and for an even more delightful afternoon you gave me in the Library soon after its organization) and to tell you that I have sent a copy to Dr. Rosencrantz and a packet to you.

It was used a year ago, not this year. The printer was Harrigan Press, Worcester, Mass., December 1940.

Yours,

J. S. Fallon.

FALLON CLINIC
390 MAIN STREET
WORCESTER, MASSACHUSETTS

SURGERY
DR. JOHN FALLON

dear q comm
ans 4q
21/Jan 1951.

Jan 21-1942

Dear Doctor Francis:

I'm luxuriating in a day off, & spending it in bed for a cold - so will you look leniently on the pencil?

Your note was one of the pleasantest surprises in a long time. That Christmas card idea struck me as pretty good at the time, but lots of the recipients never read it, so I wrote it off as a flop - until your direct approval from headquarters! You encourage me to try again next year: I'm thinking of Bigelow's 1st other paper: if I do it, be sure you'll be at the top of the list. Or could you suggest a good short W.O. item?

The thing was a last-minute Christmas-rush proposition which explains, but far from excuses, the l.o.c. decimals. The 17 for 19 can be blamed only on an unarithmetic mind - I am limited to such arithmetic as can be done by a slide rule or on my fingers. Slide rules limit to addition & subtraction, & my fingers work only to 10. Conclusion - must train the toes.

FALLON CLINIC
390 MAIN STREET
WORCESTER, MASSACHUSETTS

SURGERY
DR. JOHN FALLON

You will, of course, have realized the Osler worship behind the reprint. I shan't bore you with the story - I'm just another of those who never saw him, but whose hero he still is, & who lap up every available crumb of Osler data — such as "an Osler Day". By the way, I'm binding it and your letter & a copy of my card. Acquaintance but me as a medical student & it is by far the most dog-eared, torn, marked and back-broken book in my library. The biog. came next - I was an intern on H.C.'s service, up til 2 AM nightly, at the time — & stayed up 'til 3, nightly, 'til it was finished. H.C. never knew he was himself to blame for his sleepy interns.

One Osler story you may not have heard, from my Father. In his early days in Worcester he had a colleague, Dr. Tom O'Callaghan, locally promising, dying early. O'C. had been a student of W.O's. Once (twice? - not sure)

FALLON CLINIC
305 MAIN STREET
WORCESTER, MASSACHUSETTS

SURGERY
DR JOHN FALLON

FALLON CLINIC
390 MAIN STREET
WORCESTER, MASSACHUSETTS

SURGERY
DR. JOHN FALLON

when the chief's itinerary lay through Worcester, he stopped off from the train an hour or two, took a hack to O'C's office + passed the time of day ~ him.

Of course I realize my Osler reprint, although probably legal, was rankly unethical without the approval of his library executor. But, you know, I never even thought of the point at the time: all of us Osler fans, I suppose, think of W.O. as our own especial property. I'm awfully glad his executor is good natured. The same argument explains the familiarity of this letter: for some 20 years W W Francis has been more familiar to me than many of my own family.

Letters in pencil are so easy they tend to run on + on!

Very gratefully—
John Fallon.

Dr. W. W. Francis -
Osler Library
McGill

FALLON CLINIC
360 MAIN STREET
WORCESTER, MASSACHUSETTS

SURGERY
DR. JOHN FALLON



Merry Christmas and the Microscope

[Printed for Dr. Fallon at the Harrigan Press, Worcester, Mass., Dec. 1940.]

To Dr. W. W. Francis,
who should have
had one long ago!

J. Sh. Fallon

Worcester
1-19-42



Merry Christmas!

WE HAVE a book collector friend who is too soft hearted to be successful. Because we admired it, he gave us his copy of Hardwicke's Science Gossip for 1869. This is an antiquated hodge-podge of semi-science, broken-backed, torn, and worthless but for one page. That page is Osler's rare first paper, written while "Willie" was home for Christmas from his first year in medical school. He was ~~seventeen~~ 19, had already been exposed to "Father" Johnson, and, after a boyhood on the frontier of Canada's western wilderness, had just come under the influence of James Bovell and Toronto.

Slight as the paper is, you can see Osler in it: the frontier boy playing with a microscope instead of a gun, and on Christmas at that; the Canadian-ness of it; the ringing in of Christmas and a tag from the classics; and so on. Especially in the sentence: "In this country, wherever there is a good spring some kind individual sinks a barrel for the benefit of the community at large."

It's genuine Osler, without doubt. And if Osler edged Christmas into a scientific paper, we thought we might edge a scientific paper into Christmas. We'd like to share with you, for Christmas, the present our friend gave us. So here's a microscopic paper as our Christmas card.

The good wishes that go with it are not microscopic.

FRANCES AND JOHN FALLON.

MICROSCOPY

CHRISTMAS AND THE MICROSCOPE.—

Nec jam sustineant onus,
Sylvæ laborantes, geluque
Flumina constiterint acuto,

might well be said of Canadian woods and streams at this season of the year. The earth has put on her winter robes, and under them she hides most of those objects which in summer please and delight us so much. A cheerless prospect for microscopists, one would think. So I thought, as on Christmas afternoon I sallied out with bottles and stick in search of diatoms, infusoria, snow-peas, &c., though I did not expect to be very successful. After wandering about for some time, searching vainly for an unfrozen stream, I was about to return home with empty bottles, when I suddenly bethought myself of an old spring which supplied several families with water, and which I knew therefore would be unfrozen. In this country, wherever there is a good spring some kind individual sinks a barrel for the benefit of the community at large, and thereby benefits microscopists in no small degree, for in these you are generally sure to find a good supply of microscopic objects. When I got to the spring the first thing that greeted my sight was a piece of algæ floating on the top of the water, and on a closer examination of the barrel I saw that the sides had a dark-brown coating, in which I knew diatoms and infusoria would be found. Scraping some of this off, I placed it in a bottle and retraced my steps homeward, well satisfied with my afternoon's walk. Getting home at that unfavourable time for working, just as the light is beginning to fail, I had to exercise my patience and wait till evening to see what my bottle contained. I had not long to wait, as darkness soon succeeds the light here: so when I had got a lamp lighted, I proceeded to examine my spoils. A short account of the things I found may not be uninteresting to English readers of the SCIENCE-GOSSIP, as it will give them some idea of what lovers of science meet with in this country. Upon putting a slide under the microscope before I had it properly focussed, I saw the dim outline of some little creature kicking and struggling as though it were caught in a net. It turned out to be one of the Tardigrada, or little water-bears, that had got its feet entangled in the gelatinous tube of the *Encyonema prostratum*. It was with great difficulty that it freed itself from the jelly, and then it began its slow and stately walk, which formed such a contrast with the quick, lively movements of the animalcules with which it was surrounded. The little water-bears are by no means common objects with us, but it only makes them the more acceptable when we chance to get them. The *Encyonema prostratum* seems to delight in these quiet water-barrels, though it is occasionally found on the wave-washed Cladophora of our lakes. They always remind me of the manner in which peccaries sleep, packed closely together in hollow logs. I have seen the *Encyonema* shoot out of its tube, but whether it can find its way back again or not I do not know. Two species of *Euglenæ* were very plentiful, viz., the *E. viridis* and *E. acus*. They are found here in the spring in such numbers as to give to the water they are in a dark green colour. The *Paramecium aurelia* and *Kolpoda cucullus* were in great abundance. Among other Infusoria were the *Amphileptus anser*, two species of *Vorticellinæ* and the *Leucophrys patula*. Of Desmids there were three species: *Closterium acerosum*, *Cosmarium undulatum*, and *Scenedesmus quadricauda*. Of Diatoms, besides the *Encyonema*, the following species were present: *Gomphonema coronatum*, *G. minutissimum*, *Melosira varians* (Thwaites), *Fragillaria rhabdosoma*, *Meridon vernale*, *Navicula amphirhynchus*, *N. librile*, *Hyalosira rectangula*, *Synedra splendens*, *Cymbella gastroides*, and some others.—*W. Osler, Dundas, Ontario.*

(A line-by-line printed, not photostated, copy.)